FOURTH BIENNIAL REPORT

OF THE

BOARD OF TRUSTEES OF THE IOWA STATE

AGRICULTURAL COLLEGE

AND FARM

TO THE

GOVERNOR OF IOWA.

DECEMBER, 1871.

DES MOINES:
G. W. EDWARDS, STATE PRINTER.
1872.

STATE AGRICULTURAL COLLEGE,
AMES, IOWA, December 15, 1871.

TO HIS EXCELLENCY, SAMUEL MERRILL, GOVERNOR:

In accordance with the statute defining the duties of the Board of Trustees of the Iowa State Agricultural College and Farm, I have the honor to submit herewith the Fourth Biennial Report of said Board.

By order of the Board of Trustees.

A. S. WELCH, *President.*

I. P. ROBERTS, *Secretary.*

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*Elected to fill the vacancy occasioned by the resignation of J. H. Woodbury.

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ELLEN S. TUPPER,
LECTURER ON BEE CULTURE.

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*Will be appointed by the opening of the next Spring Term.

[No. 17.]

PRESIDENT'S REPORT.

IOWA STATE AGRICULTURAL COLLEGE,
December, 6th, 1871.

Gentlemen of the Board:

The Iowa Agricultural College has completed its third collegiate year. Since its opening, March 1869, it has encountered and largely overcome many difficulties incident to enterprises of a similar character. The objects sought in its organization compelled the College at its outset to enter upon experiments which were either wholly untried, or having been tried in other quarters, had wholly failed. In some of the schools of the other States, daily manual labor as an auxiliary in higher education had been adopted, and after a brief trial abandoned. The weight of opinion and authority throughout the world was against the co-education of the sexes. They might indeed associate for most other purposes in life, but higher learning could be gained it was thought only by sexual isolation. Then further, the theory on which this college was founded reversed the time-honored maxims of the world, and set at naught the experience of ages. The old theory which still prevails declares that learning should be taught for the culture it affords, and that its application to the affairs of life is a result of inferior value. On the other hand the new theory which we have adopted, affirms that knowledge should be taught for its uses; that culture is an incidental result, and that the philosophy of the law is genuine which declares that this Agricultural College shall be established in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.

When, therefore it was settled as the policy of the Agricultural College, that daily manual labor should be required of the students; that a garden, a nursery, a workshop, a boarding hall and a farm, should be conducted on model plans, mainly by student help; that

women should be admitted as equal participants in labor and study; and that the branches embraced in the various courses, should be selected with reference to their value in the industrial pursuits; all these made the new enterprise very interresting and very difficult.

But in the prosecution of this new enterprise we have had many advantages. Public opinion in Iowa is favorable to progress in education as in other human interests; no educational bigotry has trammeled our efforts; the State has supplied liberally the means for erecting suitable public buildings; on all vital questions the Board of Trustees has been a unit in purpose and policy; the faculty, gradually and carefully selected, have brought to their work a full measure of learning, industry, and enthusiasm; the students gathered from all parts of the State, have been generally hardy, earnest, and free from bad habits; each year the number of applicants for admission has greatly exceeded our accommodations. The public confidence in the management of the College is constantly increasing; and if all who have influence or authority in the affairs of the institution continue to work together with the harmony hitherto maintained, then success full and complete lies before us.

I dare not affirm that we have made no mistakes in minor matters, but I do affirm that in no department have we made any serious failure, and that for the past year the condition and progress of every department have been more satisfactory than during any preceding one.

While therefore I shall suggest some modifications of policy, each under its proper heading, I would earnestly recommend that no radical changes be made except after the most careful deliberation and scrutiny. The Agricultural College is now fully organized on the plan adopted by the Board of Trustees in October, 1868, and the experience of each succeeding term has given additional proof of its excellence.

Subjoined is a list of the officers employed for the year 1871, with their respective salaries.

A. S. Welch, A.M., President, and Professor of Moral and Mental Philosophy	$3000.00
Geo. W. Jones, Jr., A.M., Professor of Mathematics, and Cashier	2400.00
James Mathews, Professor of Pomology	2000.00

Wm. A. Anthony, B. Ph., Professor of Physics and Mechanics	$2000.00
Albert E. Foote, M.D., Professor of Chemistry	1500.00
General James L. Geddes, Steward, and Professor of Military Tactics and Engineering	Board and 1400.00
Chas. E. Bessey, B.S., Instructor in Botany and Horticulture	1250.00
Miss Mary Lovelace, Preceptress	800.00
Miss Augusta Mathews, Teacher of Instrumental Music	650.00
Miss M. P. McDonald, Matron	650.00
Expended by the President, on the authority of the Board, for teaching.	485.17

ADDITIONAL PROFESSORS NEEDED.

At the opening of the College year, March 6th, 1872, our first Senior class will commence the studies of the Senior year. To meet the demand for additional instruction the Seniors of the Agricultural course will need a Professor of Practical Agriculture, who besides other important duties, will give lectures on Comparative Anatomy and Physiology, and Veterinary Science.

The Seniors in the Mechanical course will require for the studies that year, a Professor of Civil Engineering and Architecture.

For the students both of Agriculture and Mechanics in the Senior courses the appointment of a Professor of Geology will be necessary. It will be fortunate for the College if a man can be found to fill the chair of Geology who is a taxidermist, and can act as curator of the zoological and geological collections for the museum.

One of the earliest appointments made by the Board was that of O. H. St. John, as Assistant Professor of Geology. I wrote him last February that his services would be needed at the opening of the year 1872. Not knowing his whereabouts I forwarded the letter through Professor White of the University, and regret to say that I have received no answer.

CLASSES TAUGHT, AND BY WHOM.

FIRST TERM.

TAUGHT BY THE PRESIDENT—		
	Junior Class—Landscape Gardening	26
	" Study of Words	11
	Freshman Class—Rhetoric	43
	" Analysis	35

TAUGHT BY PROF. JONES—
- Junior Class—Calculus 11
- Sophomore Class—Trigonometry and Surveying..... 17
- Freshman Class—Algebra 67
- " Arithmetic..... 21

TAUGHT BY PROF. MATHEWS—
- Fruit Culture..... 12

TAUGHT BY PROF. ANTHONY—
- Junior Class—Mechanics..... 14
- " Shades, Shadows, and Perspective 13
- Sophomore Class—Physics..... 32

TAUGHT BY PROF. FOOTE—
- Junior Class—Organic Chemistry 20
- " Quantitative Analysis..... 2
- Sophomore Class—General Chemistry 35

TAUGHT BY PROF. GEDDES—
- Junior Class—Topographical Drawing 26
- " Artillery Drill 19
- Freshman Class—Book-Keeping 54
- " Freehand Drawing 91
- " Infantry Tactics 45

TAUGHT BY MR. BESSEY—
- Junior Class—Botany 17
- Sophomore Class—Botany 27

TAUGHT BY MISS LOVELACE—
- Freshman Class—Algebra..... 40

TAUGHT BY MISS MATHEWS—
- Instrumental Music 23

TAUGHT BY MISS MCDONALD—
- Freshman Class—Analysis..... 37

TAUGHT BY MR. C. L. SUCKSDORF—
- Sophomore Class—German 12
- Freshman Class—German..... 30

TAUGHT BY MISS M. A. LOCKE—
- Vocal Music 35

SECOND TERM.

TAUGHT BY THE PRESIDENT—
- Junior Class—Study of Shakspeare 17
- Sophomore Class—Stock Breeding..... 16
- Freshman Class—Kames' Elements of Criticism 34
- " Normal Instruction..... 50

TAUGHT BY PROF. JONES—
- Junior Class—Farm Engineering..... 11
- Sophomore Class—Analytical Geometry 4
- " Descriptive Geometry 3
- Freshman Class—Geometry.....

TAUGHT BY PROF. MATHEWS—
- Fruit Culture..... 19

TAUGHT BY PROF. ANTHONY—
- Junior Class—Physics..... 26
- " Mechanics..... 10
- " Mechanical Drawing..... 9
- Sophomore Class—Physics..... 19
- Freshman Class—Physics..... 62

TAUGHT BY PROF. FOOTE—
- Junior Class—Qantitative Analysis..... 2
- " Agricultural Chemistry..... 16
- Sophomore Class—General and Theoretical Chemistry.. 23
- " Qualitative Analysis 15

TAUGHT BY PROFESSOR GEDDES—
- Junior Class—Artillery Drill..... 10
- Freshman Class—Freehand Drawing (advanced)..... 27
- " Freehand Drawing (beginning).. 25
- Infantry Tactics..... 20

TAUGHT BY MR. BESSEY—
- Sophomore Class—Botany..... 14
- " Zoology and Entomology..... 20
- Freshman Class—Physiology..... 63

TAUGHT BY SUPT. ROBERTS—
- Junior Class—Management of the Horse..... 11

TAUGHT BY MISS LOVELACE—
- Freshman Class—Algebra..... 34
- " Arithmetic..... 36

TAUGHT BY MISS MATHEWS—
- Instrumental Music..... 23

TAUGHT BY MISS MCDONALD—
- Freshman Class—Analysis 21
- " Rhetoric..... 17

TAUGHT BY MR. C. L. SUKSDORF—
- Sophomore Class—German 7
- Freshman Class—German 22

TAUGHT BY MISS M. A. LOCKE—
- Vocal Music..... 27

ENROLLMENT.

The following are the numbers enrolled in the classes during the year:

	First Term.	Second Term.
Junior Class—		
Young men	31	25
Young ladies	2	1
Totals	33	26
Sophomore Class—		
Young men	29	22
Young ladies	11	8
Totals	40	30
Freshman Class—		
Young men	87	72
Young ladies	36	27
Totals	123	99
Students not fully accepted as Freshmen—		
Young men	....	10
Young ladies	....	9
Total	....	19
Students rooming in the building	168	138
Students rooming out of the building	28	36
Totals	196	174

Number of different students in attendance during the year..... 220

Forty-nine Districts were represented in the College during the year, as follows:

STUDENTS IN THE BUILDING.

No. District.	Counties.	Students.	No. District.	Counties.	Students.
1	Lee	2	43	Story	11
2	Des Moines	2	44	Tama	1
3	Henry	4	45	Benton	13
4	Jefferson	2	46	Marshall	1

STUDENTS IN THE BUILDING—Continued.

No. District.	Counties.	Students.	No. District.	Counties.	tudents.
5	Van Buren	2	47	Linn	1
6	Wapello	8	48	Jones	2
10	Lucas	6	49	Dubuque	1
15	Ringgold and Taylor	1	50	Delaware	1
19	Pottawattamie	2	51	Clayton	
20	Cass, Adair, and Montgomery	4	52	Allamakee	2
22	Warren	2	53	Buchanan	6
23	Marion	6	54	Fayette	3
25	Keokuk	3	55	Winneshiek	4
26	Washington	6	58	Floyd	4
28	Muscatine	2	59	Bremer	2
29	Cedar	2	60	Black Hawk	2
30	Scott	8	64	Wright, Hamilton, and Humboldt	5
31	Clinton	8	65	Webster	1
32	Jackson	4	66	Cerro Gordo, Worth, Hancock, and Winnebago	7
33	Johnson	1			
35	Poweshiek	1	67	Kossuth, Crocker, Palo Alto, Pocahantas, and Calhoun	2
36	Polk	8			
37	Jasper	2	68	Carroll, Sac, Buena Vista, and Cherokee	7
38	Dallas	3			
39	Guthrie and Greene	2	69	Woodbury, Ida, Plymouth, Sioux and Lyon	1
40	Audubon, Shelby, Crawford, and Monona	2			
42	Boone	9		Total	182

DAY SCHOLARS.

Taylor	1	Boone	3
Polk	2	Story	27
Greene	2	Wright	2
Lucas	1		
		Total Day Scholars	38
Students in the building			182
Day scholars			38
Total			220

Twenty-one Districts were not represented.

No. District.	COUNTIES.	No. District.	COUNTIES.
7	Davis	24	Mahaska
8	Monroe	27	Louisa
9	Appanoose	34	Iowa
11	Wayne	41	Harrison
12	Decatur	56	Mitchell and Howard
13	Clarke	57	Chickasaw
14	Union and Adams	61	Butler
16	Page	62	Franklin and Grundy
17	Mills	63	Hardin
18	Fremont	70	O'Brien, Clay, Dickinson, Emmet, and Osceola
21	Madison		

Nearly three-fourths of the State when reckoned by districts is represented in the College; but much more than three-fourths is represented when reckoned by population. Only one district with two assemblymen—the 24th—has failed to send pupils. Of the rest, some, as in the southern tier, have very difficult access by railway, while others are composed of counties which are new and sparsely settled. The 70th district, for example, comprises five counties, viz: O'Brien, Clay, Dickinson, Emmet, and Osceola; and probably this entire district containes few if any young people who are sufficiently advanced to pass our examinations for admission to the Freshman Class.

APPOINTMENT.

The county superintendent of public schools is empowered by law to appoint one student to the Agricultural College, for each representative sent by his district to the popular branch of the Legislature. When the district comprises several sparsely settled counties, it is assumed that the superintendent of the same county in which the reprsentative resides is entitled to appoint. We have written to the superintendents in districts still unrepresented in the College, inviting them to exercise the privilige of appointment before January 1st, 1872.

Outside of the appointees so selected all students desiring admission make written or personal application to the president who will accept candidates in such a way that the number of students from any one county or section shall not greatly preponderate over those from other parts of the State.

EXAMINATIONS.

The following questions in Grammar, Spelling, Geography, Arithmetic, and Algebra give a clear idea of the examinations which a student is required to pass before he can be admitted to the Freshman class of the Iowa Agricultural College.

Of course these particular examples are *only specimens* intended simply to show the *average* character of such examinations. To avoid the expense of a useless journey, every applicant for admission to the College should be certain before leaving home, that his

knowledge of the common branches is up to the standard required by these papers.

In each of the following studies the applicant must answer correctly at least 75 per cent. of the questions:

GRAMMAR.

1. Name and define all the parts of speech.
2. Parse *him* in the following sentence: "I saw him run."
3. Parse *who* in the following sentence: "Who steals my purse, steals trash."
4. Parse *what* in the following sentence: "What the weak head with strongest bias rules, is pride."
5. Write the names of the tenses of the verb, and explain how each tense is formed.
6. What is the office of the participle?
7. Parse each word in the sentence: "I might have been struck."
8. Analyze the following, giving the relation of each word:

> "'Tis a time
> For memory and for tears. Within the deep
> Still chambers of the heart, a specter dim,
> Whose tones are like the wizard voice of Time
> Heard from the tomb of ages, points its cold
> And solemn finger to the beautiful
> And holy visions that have passed away,
> And left no shadow of their loveliness
> On the dead waste of life."

SPELLING.

Write the following:

Coercion,	Ecstasy,
Intermittent,	Erysipelas,
Clarinet,	Ellipsis,
Paralyze,	Heresy,
Tyranny,	Separate,
Epitaph,	Crescent,
Guitar,	Chagrin,
Myrmidon,	Guillotine.

GEOGRAPHY.

1. Name in order of size the three largest rivers in the world, the three largest in North America, in South America, in Asia, in Europe, in Africa.

2. Name in order the three longest mountain chains in the world. Give their general direction, position and hight.

3. Name in order the three largest cities in Europe, in Asia, in North America, in the world.

4. Which cities lie farthest north, New York or Rome? Boston or Paris? Quebec or London? Charleston or San Francisco?

5. Which cities lie farthest east, Rio Janeiro or Chicago? St. Petersburg or Berlin? Calcutta or Melbourne?

6. Through what waters does one sail going from New Orleans to Hong Kong and return, going around the world? What winds favor him? Near what lands does he pass?

7. Bound Iowa, Massachusetts, South Carolina.

8. State the geographical advantages of St. Louis for a great city.

ARITHMETIC.

1. Divide 365729 by 365.

2. Find the prime factors of 345345.

3. Get the greatest common divisor of 1155, 15015 and 345345.

4. Reduce to its lowest terms 737-871.

5. Multiply .055 by .1001.

6. Divide 30 A. 3 R. 35 P. 25 yds. 7 ft. by 5.

7. Get bank discount on $560.27 for 90 days at 7½ per cent.

8. What is the equated time of payment of $500 due October 1, $600 due November 1, and $700 due December 1.

9. If 4 men in 6 days cut 36 cords of wood, in how many days will 9 men cut 27 cords?

10. Divide $1000 among four partners, in the ratio of 1, 2, 3, and 4.

11. Get square root of 626.001.

12. Get cube root of 513 to three decimal places.

Explain reasons of the several processes, and give the rules therefor.

ALGEBRA.

1. Define the following words as used in Algebra: Coefficient, index, root, power, positive, negative, monomial, binomial, trinomial, &c.

2. Form and name the several signs used in Algebra.

3. Explain the processes of addition, subtraction, multiplication, division and factoring, with examples.

4. State the processes of getting the greatest common divisor, and least common multiple of algebraic quantities, with examples.

5. State the processes of adding, subtracting, multiplying, and dividing fractions, with examples.

It is important to the last degree that students should begin their course in higher industrial education with a thorough knowledge of the common branches. Many candidates were rejected last year because they had failed to master the elements of English Grammar. The questions asked will of course be changed in each examination, the above specimens being about an average in severity. The examinations will be in writing.

DEPOSIT.

Accepted candidates will deposit ten dollars each with the cashier, as a security for the payment of their bills, and have their names entered upon his books; after which they are considered members of the College, in full standing, and entitled to all its privileges.

EXPENSES.

Students pay actual cost for board, fires, lights, laundry, damages to the property of the College when caused by themselves, care and general repairs of the College buildings and furniture, and for such other incidental expenses as specially belong to them as a body.

Tuition and rooms free. Students pay nothing for the general expenses of the College.

Students are paid for their labor at its value to the College, the rate per hour varying from three to nine cents.

Upon entering the College each student will deposit ten dollars

as before mentioned. He will settle all bills for each month at the cashier's office, on the second Saturday of the month following, the original deposit being retained till final settlement. Any student who neglects to make such monthly settlement, except for reasons satisfactory to the President, may be dismissed by him for such neglect.

Damages to the college property will be charged to the person damaging the same, if known, but if its author is undiscovered, it will be assessed upon the section where it occurs, or upon the whole school.

Students supply themselves with bedding and towels, and with carpets, if they desire them. All other furniture, including mattresses, is supplied by the College.

For the past year the rates of charge have been as follows:

For board (average)	$2.73 per week
For fires and lights (average)	30 per week
For laundry (per dozen pieces)	50
For incidental expenses	25 per week

A fair estimate of the expenses for next year may be set down as follows:

For board, 36 weeks	$90.00	$90.00
For laundry	5.00 to	15.00
For fires and lights	9.00 to	12.00
For repairs, and incidental expenses	9.00 to	12.00
For books and stationery	10.00 to	20.00
	$123.00	$149.00

Students' earnings vary with their age, health, strength and previous knowledge and skill, the time they devote to labor, and their general efficiency. The past year they have earned, in some instances, as much as $100, and have, by strict economy, nearly paid their College expenses. An average of earnings for the past year has been $50; including the young, the sick, and the inexperienced.

GOVERNMENT.

The government of the Agricultural College is uniform, impartial, and adapted to secure to the student the full value of all his privileges.

The young men and women are expected to do all the duties assigned them, whether of labor or study, promptly and regularly. If they cannot bring to such duties an earnest zeal and a hearty good will they would far better stay at home. The president and faculty cannot give their energies, already overtaxed, to reforming disorderly boys or urging unwilling ones to study. The Iowa Agricultural College is in no sense a reform school. Its province is to instruct and encourage those, who are earnest seekers for higher education, and not to reform those who are idle and morally perverse. A few law-breakers destroy the harmony of the entire institution, and become an intolerable burden to the officers. If any such are found among our numbers, we shall require them to withdraw as soon as kindly advice and patient admonition are found to be of no avail. The State and national bounty must not be wasted on thoughtless boys and girls, who do not appreciate it, and will not profit by it, and parents are earnestly advised not to send children here, who have proved unmanageable at home.

It is gratifying to add to these statements, that nearly all our pupils have been studious and law abiding, true to themselves and the institution.

In order to obtain all the benign effects of self-restraint, the most important part of college government (that of rooms and halls), is entrusted to the students themselves, and I am glad to to assure the Board that my confidence in the self-government of students is unabated, and that I would rather increase than diminish its extent.

Subjoined are the principal rules of government passed by the faculty for the management of the College.

RULES OF THE COLLEGE.

1. The recitation hours of the day and the hours of the evening from seven to ten o'clock, except on Saturday and Sunday evenings, are set apart as study hours.

2. During study hours all students except such as are detailed for work, shall study quietly in their rooms.

3. During the study hours students may not leave their rooms, except for unavoidable reasons approved by the presiding officer of the section.

4. Lights shall be extinguished at ten P. M.

5. From ten P. M. till the rising bell are hours for sleep. During the hours of sleep no student may leave his room except for unavoidable reasons, nor in any way disturb his neighbors.

6. On Saturday and Sunday evenings the same quiet order shall be maintained in the rooms and halls as on other evenings. But this rule shall not be construed to forbid students visiting each other's rooms, provided that not more than two visitors shall be in any room at a time.

7. Loud talking, whistling, scuffling, gathering in hall or stair cases, and boisterous and noisy conduct, are at all times forbidden.

8. No student may take books from the Library.

9. Students shall preserve the same order in the Library as in the recitation room.

10. Five minutes from the ringing of the bells for meals, will be allowed for assembling in the dining-room, after which the doors shall be closed.

11. Students shall attend promptly all exercises of classes to which they belong. When students have been absent from any recitation, if excused they may make up such recitation within two weeks.

12. Students shall be detailed for labor by the President, and shall work as directed an average of two hours and one half per day for five days in the week.

13. Examinations at the terms' close shall be conducted in writing when possible, upon questions proposed by the instructors of the various classes.

14. Students may not visit the dining-room, laundry, kitchen, bakery, store-room, cellar, ice-house, workshop, or barns, nor walk through the meadows, lawns, or growing crops, without special permission.

15. The use of intoxicating liquors is prohibited to members of the College.

16. At the student's entrance into College and at the beginning of each month thereafter he shall deposit with the cashier the sum of ten dollars on account (or in default thereof give satisfactory security) and settle all bills in full at the close of each month.

17. Students will assemble in the chapel every evening, and at three o'clock every Sunday afternoon, for public worship.

18. Excuses for unavoidable absence from any exercise, will be granted by the President only, upon personal application made by the student as early as possible after such absence.

19. Students may not abstract or remove any article, wheth clothing, food, furniture, tools, fruit, or any other property of the College.

20. At the beginning of each term there shall be elected from each section one councilman, one captain, and one lieutenant. No student who is a law-breaker shall be eligible to any office of trust or honor in the College.

21. It shall be the duty of the council to try all offenses reported by the captains of sections, and to report their proceedings to the faculty at such times as the faculty may require. The council shall hold two regular meetings each week for the purpose above named, at such time and place as may be most convenient. The council shall organize by choosing a president and a secretary from their own number, whose duties shall be the ordinary duties of such officers in deliberative assemblies,

22. The business of the council shall be limited to the trial of offenses reported by the captains of sections. The president of the council shall in every trial preside as judge, and he shall appoint one member thereof to conduct the prosecution, and one for the defense of the accused, and the trial shall be confined strictly to the offense reported.

23. The accused shall be present during his trial, and shall have the privilege of cross-questioning witnesses in person or by his attorney. The verdict and the number indicating the degree of demerit shall each be given by vote of the council, in which the president shall have only the casting vote.

24. It shall be the duty of each captain, and of his lieutenant in the captain's absence, to preserve order in his section according to law, and report all violation of law to the councilman of his section, who shall file such report in the President's office, for the secretary of the council. The captains of sections, and their lieutenants shall meet once each week with the President at his office for informal report as to the condition of the government in their sections, and to

consult as to the best means of securing harmony and efficiency in their sections.

25. When the demerit marks of any student reach five in number, he will be warned by the President in private; when his demerits reach ten, the President will again warn him, and advise his friends of such action, with the reasons therefor; for fifteen demerits he shall be requested to withdraw from the College.

26. The faculty reserve the right to try all cases of disorder, disobedience, or immorality, not herein enumerated.

27. The faculty reserve the right to expunge the demerit marks of any student, when less than five in number, upon his subsequent blameless conduct.

MONTHLY STATEMENT TO PARENTS.

As an incentive to persistent study and good conduct, I have during the last year sent to the parents of every student a monthly statement of his progress and behavior. As this practice has been satisfactory to pupils, and highly satisfactory to parents, I propose to continue it.

DUTY OF PARENTS.

It is clearly the duty of those who send children to the Agricultural College to provide for their remaining at least one entire term. The withdrawal of a student before the close of a term is a serious detriment to his own progress, and to the welfare of the college. It leaves studies unfinished, and rooms vacant at a time when it is impossible on account of the advancement of classes, to fill them. Would it not be well to require that parents whose children are admitted should give a written pledge that they should not be recalled until the term is finished, except for sickness or serious misfortune.

MANUAL LABOR.

The law requiring students to labor an average of two hours and a half a day throughout the year, has been well sustained. The salutary result of daily work by students has been seen in their general cheerfulness and uniform good health. Manual labor though often

vexatious in detail, and difficult to manage, answers so many important purposes that I see not how the college could dispense with it. It applies the principles of science to the processes of industry, it gives expertness in one or more of the various handicrafts, it imparts and sustains muscular vigor, and has a wholesome moral effect on the entire college.

We are watching this feature of our enterprise with great interest, ready to adopt any improvements which experience shall suggest. The following changes for the next year will it is thought be wise:

[Adopted by the Board, December 7, 1871.]

1st. To dispense with the forming of squads, allowing the superintendents to make such daily divisions of the working force as the work requires.

2nd. To detail an adequate number of workers to each superintendent for the month, permitting no changing from one department to another except on recommendation of the superintendents; and requiring the superintendents to report to the president at the end of the month each student's number of hours worked, the rate per hour, and the sum total of his earnings. Such reports can be used in the monthly settlements with students, without being entered in a work book.

3d. To dispense with captains, and detail two or three energetic seniors to act as foremen whenever their services are required.

4th. To accept field surveying and mechanical drawing in the proper classes, as manual labor within the meaning of the law, though not subject to pay.

The following are the established rates of payment:

I.

Students working on the farm, or doing other heavy work which is not instructive, shall be paid at the rate of from three to nine cents per hour.

II.

Students performing skilled labor in the garden, orchard, or ornamental grounds, under the instruction of the proper officers, shall be paid at the rate of from three to seven cents per hour.

III.

Students laboring in the work shop shall be furnished with tools, and all needed instruction, but shall receive no compensation until their labor is of value to the College, when they shall be paid the same as those laboring on the farm, deducting a moderate sum for the use of the tools.

IV.

Young ladies laboring in the dining-room, kitchen, laundry or, bakery, shall be paid the rates received by young men laboring on the farm.

V.

All labor by students shall hereafter be supervised personally by an officer of the college, or by a foreman under his charge.

Total amount paid for student labor during the year 1871, $7,050.98.

PRESSING WANTS.

Though the State has dealt liberally with the Agricultural College, it still has pressing necessities. A little over three years ago this building, unfinished and solitary, startled the traveler by the novel contrast of its towers and Mansard roof with the wilderness of the prairie around it. The village of Ames was too distant to make its dwellings available as homes for the students. The few houses that dotted the country within convenient distance could not furnish lodgings for more than thirty, and consequently the College was compelled to face at once the double difficulty of supplying materials for recitation and for residence. It had to provide not only for the day's work but for the night's sleep as well. And every year the number received has been limited, not by the extent of our teaching forces, nor the size of our public rooms, but by the paucity of our sleeping apartments. The demand for these at every opening, has far exceeded the supply, and from the beginning every step of our way has been embarrassed by questions of bed and board.

At their last session the Legislature granted an appropriation of $50,000 for extending the wings of the present building. The new wings will be ready for occupation next spring, and they will contain a spacious library room well fitted up, an ample museum, two new recitation rooms, a large kitchen with proper offices, and twenty-two additional students' rooms. These last will enable us to receive within the building next spring an aggregate of two hundred students. But our accepted applications for next year have already nearly reached that number, while the season when applications are most numerous lies still before us. The truth is, we have great need even now of a portion at least of the new students' building, which two years ago we urged the State to erect, and this necessity will be a crying one until the number of students we are able to admit shall correspond to the facilities for instruction, and the teaching forces which the income arising from the national grant will sustain. With the equipment and faculty, which our income if properly applied will warrant, we could teach five hundred as well as two, and I cannot but regard the State as bound ultimately to supply accommodations for this number, by the law of the contract it entered into in accepting the Congressional grant.

I am very reluctant, however, that our asking should exceed the willingness of the Legislature to grant, and would confine it to the smallest sum that will cover our indispensable wants. Referring to the plan of a building for students' rooms, described on page 31 of the last Biennial Report of the Board, it will be observed that it comprises five sections, three of which compose the main building and two the wings. By reducing the size of the rooms in that plan to 12 x 13½ feet, and the width of the halls to 7 feet, two sections of the main building would lodge sixty-four students, and could be put up with arrangements for light, heat, and water, for $35,000. This amount is then the very least we can ask this year for students' rooms, and I am sure it could not be refused without giving to the normal and proper growth of the Agricultural College, a most unfortunate check.

But there is another want equally important, and which will require a somewhat larger sum to meet. Last year a small chemical laboratory was built by the most rigid economy, with an appropriation of $ 5,000. It hardly suffices for the present number of students

in chemistry. The Department of Physics, ably taught by Prof. Wm. A. Anthony, and one of the largest and most important in the College, is crowded into two small basement rooms, with no adequate space for seating for lectures or experiments, or for storing apparatus. In every school of industrial science, the study of Physics is specially prominent, and I cannot conceive how the interests of the College and the State can be better subserved, than by the erection of a building for a Physical Labratory which shall meet to some extent, the wants of the future as well as the present. According to the plan and estimates made by Prof. Anthony, including necessary fixtures and gas works for lighting, it would cost $45,000, a sum which I feel confident the Legislature will grant when its members understand how seriously the institution will suffer if such a building should not be provided for.

Nor can the needs of the Farm, though requiring less money to supply them, be for a moment overlooked. The College Farm and its belongings are simply apparatus for instruction—invaluable when skillfully handled, but worse than valueless with bungling and slovenly management. It is evident to all our visitors, that under the supervision of Mr. Roberts the farm is rapidly improving. But the last appropriation was meager, and the call for further facilities is now very emphatic. For example, the stock increasing in number has outgrown the barn. Our fine Durham bull will soon outgrow his usefulness, because of the hazard of inbreeding. We want a new barn, of adequate dimensions; another Durham bull, the best that can be found; a Percheron stallion, so that we may produce some superior samples of farm horses, and also a small amount for minor permanent improvements. For all of which the sum of $7,000 is the least that can be named.

I sympathize also with the Prof. of Horticulture, who sorely needs a garden-house, having made shift to get on without one for the past two years, at great disadvantage. Such a structure can be built according to the plan of Professor Bessey, with cellar for vegetables, and tool and seed rooms, for the moderate sum of $2,500.

$1,000 will be required, also, to carry out the commendable plans on which Professor Matthews has commenced the orchard, vineyard and nursery. For a view of the future profit such an investment will bring, see Professor Matthews' report.

There can be no justifiable delay in providing for a permanent supply of good water for the buildings. So far our expedients for obtaining water have, on account of limited means, been quite inadequate. The well, seventy rods west, from which the water was pumped into the building by means of a wind mill, has the last two years failed about midsummer, and compelled us to depend on water wagons for a precarious supply. This method of getting water is expensive, and intolerably vexatious, and calls for immediate remedy. One hundred and eighty rods east of the College is a spring with an abundant flow of pure water throughout the year. A committee, of which Professor Jones is chairman, appointed by the Board to investigate this matter, have decided that water can be forced by steam from the spring into all the buildings where it is needed at the estimated cost of $5,000. You are referred for particulars to the report of the Committee in question. I hope it will be adopted and the money earnestly asked for. [For report, see proceedings of the Board.]

An amount not less than $4,500 ought to be appropriated and expended in building a house for General Geddes, and I will only add in respect to this item of our unquestionable needs, that we cannot expect long to retain the services of so valuable a professor, unless we can offer for the comfort of his family a dwelling less distant, and more commodious, than any he is able to rent in the village of Ames.

FURNITURE.

For supplying the new wings with suitable furniture, there will be a call for three thousand dollars.

COLLECTIONS.

Physical Cabinet.—The physical apparatus is as yet far from complete, but the collection consists of the finest instruments of their kind, not illustrative merely, but adapted to the determination of accurate results. The cabinet contains a complete Melloni's apparatus for studying the laws of radiation, absorption, and reflection of heat; a magic lantern with various attachments for the projection of physical phenomena, an indicator, and several other instruments.

The collection will be increased as fast as possible, and it is the design to make it as full and complete as that of any institution in the country.

THE WORKSHOP—Is furnished with various tools for wood and metal, including two very excellent lathes, constructed at the machine shop connected with the Worcester Free Institute.

The machinery is driven by a fifteen-horse-power Corliss engine, which has given the most perfect satisfaction ; always working with the most perfect regularity, and never having been once out of repair during the past year.

MUSEUM.—The museum contains the Shaffer collection of Mammals, Birds, and Reptiles, illustrating the fauna of our state.

In the College Herbarium there are now about twenty-five hundred species, and to this number additions of American and European plants are being made as rapidly as possible.

Dr. Foote's cabinet of Minerals, consisting of about five thousand specimens, many of them very rare and valuable, is accessable to the students studying Mineralogy. This collection is undoubtedly the finest in the West.

CHEMICAL LABORATORY.

The new Chemical Laboratory has been furnished with tables, furnaces, sandbaths, balances, and other apparatus, both for general and analytical chemistry. Gas and water are supplied to each table.

LIBRARY.

The library consists of about twenty-four hundred volumes. It embraces the standard works of English and American authors, and many books of great scientific value. These books have been selected with reference to the needs of the various departments.

Bill bought of Worthington, Montreal, last year, and paid this year.....	$852.60
Bill of books purchased this year.....	391.46

COURSES OF STUDY.

AGRICULTURAL COURSE.

FRESHMAN YEAR.

FIRST TERM.—Analysis of English Language: Rhetoric.
Algebra.
Book-keeping.
Freehand Drawing.
German: French. (*Optional to proficients in Analysis*)
Elocution.
Penmanship.

SECOND TERM.—English Literature: Elements of Criticism.
Geometry.
Physiology: Physics.
German: French. (*Optional.*)
Freehand Drawing.
Elocution.
Penmanship.

SOPHOMORE YEAR.

FIRST TERM.—General Chemistry.
Botany: Physics.
Trigonometry and Surveying: Field practice, Plats, and Topographical Maps.
Agriculture—Lectures on Preparation of Soils; Management of Crops.

SECOND TERM.—General Chemistry and Qualitative Analysis.
Zoology: Entomology.
Botany: Physics.
Agriculture—Lectures on the breeding, races, history, and management of stock.

JUNIOR YEAR.

FIRST TERM.—Organic Chemistry and Quantitative Analysis.
Botany.
Agriculture:—Propagation of plants, seedlings, grapes, and fruits; Orcharding.
Landscape Gardening: Study of words.

SECOND TERM.—Agricultural Chemistry: Analysis of Soils, Manure, etc.
Physics.
Study of Shakspeare.
Farm Engineering:—Drawing; Road-making; Water Supply; Farm Machinery.
Farm Architecture:—Plans for farm houses, barns, sheds, dairies, etc.

SENIOR YEAR.

FIRST TERM.—Psychology.
Comparative Anatomy and Physiology.
Mineralogy and Geology: Formation of Soils.
Agriculture:—Management of Crops and Stock.

SECOND TERM.—Political Economy: Constitutional History and Law.
Veterinary Science and Practice.
Meteorology.
Fruit Culture, and Forestry.

COURSE IN HORTICULTURE AND POMOLOGY.

FRESHMAN YEAR.

FIRST TERM.—Identical with the course in Agriculture.
SECOND TERM.—Identical with the course in Agriculture.

SOPHOMORE YEAR.

FIRST TERM.—Identical with the course in Agriculture
SECOND TERM.—General Chemistry and Qualitative Analysis.
Zoology: Entomology.
Botany: Physics.
Hot-bed Culture: Principles of Fruit Culture; Grafting and Budding; Vineyard Culture.

JUNIOR YEAR.

FIRST TERM.—Organic Chemistry and Quantitative Analysis.
Botany.
Landscape Gardening: Study of Words.
Kitchen Gardening—general management; kinds of vegetables methods of culture.
SECOND TERM.—Agricultural Chemistry, and Analysis of Soils, Manures, etc.
Physics.
Study of Shakspeare.
Farm Engineering—Draining; Road-making; Water Supply; Farm Machinery.
Farm Architecture—Plans for farm houses, barns, sheds dairies, etc.

SENIOR YEAR.

FIRST TERM.—Psychology.
Comparative Anatomy and Physiology.
Mineralogy and Geology: Formation of Soils.
Flowers and Flowering plants: Soils for different fruits.
SECOND TERM.—Political Economy: Constitutional History and Law.
Market Gardening.
Meteorology; Forestry.

COURSE IN MECHANICAL ENGINEERING.

FRESHMAN YEAR.

FIRST TERM.—Identical with the course in Agriculture.
SECOND TERM.—Identical with the course in Agriculture.

SOPHOMORE YEAR.

FIRST TERM.—Identical with the course in Agriculture.
SECOND TERM.—Analytical Geometry.
Descriptive Geometry: Physics.
General Chemistry and Qualitative Analysis.

JUNIOR YEAR.

FIRST TERM.—Differential and Integral Calculus.
Theoretical Mechanics.
Landscape Gardening: Study of Words.
Shades, Shadows, and Perspective.
SECOND TERM.—Physics.
Applied Mechanics.
Shading with India ink, and Tinting.
Study of Shakspeare.

SENIOR YEAR.

FIRST TERM.—Psychology.
Mineralogy and Geology.
Theory of Machines: Machine Drawing.
French. (*Optional.*)
SECOND TERM.—Political Economy: Constitutional History and Law.
Theory of Motors: Machine Drawing.
French. (*Optional.*)

COURSE IN CIVIL ENGINEERING.

For the Freshman, Sophomore, and Junior years, the course is identical with the course in Mechanical Engineering.

SENIOR YEAR.

FIRST TERM.—Psychology.
Mineralogy and Geology.
Civil Constructions:—Railroad Surveys; Bridge Building.
Astronomy.
French. (*Optional.*)
SECOND TERM.—Political Economy: Constitutional History and Law.
Civil Constructions.
French. (*Optional.*)

COURSE IN MINING ENGINEERING.

For the Freshman, Sophomore, and Junior years, the course is identical with he course in Mechanical Engineering.

SENIOR YEAR.

FIRST TERM.—Psychology.
Mineralogy and Geology.
Quantitative Analysis, and Metallurgy.
French. (*Optional.*)
SECOND TERM.—Political Economy: Constitutional History and Law.
Metallurgy.
Mine Surveying, and Machinery.
French. (*Optional.*)

COURSE IN ARCHITECTURE.

For the Freshman, Sophomore, and Junior years, the course is identical with the course in Mechanical Engineering.

SENIOR YEAR.

FIRST TERM.—Psychology.
Mineralogy and Geology.
History and Principles of Architecture; Detailed Study of the Orders.
French. (*Optional*).

SECOND TERM.—Political Economy: Constitutional History and Law.
Architectural Designs and Drawing.
Carpentry and Masonry.
French. (*Optional*).

COURSE IN MILITARY TACTICS AND ENGINEERING.

FRESHMAN YEAR.

FIRST AND SECOND TERMS.—Schools of the Soldier and Company.

SOPHOMORE YEAR.

FIRST AND SECOND TERMS.—Field Artillery.

JUNIOR YEAR.

FIRST AND SECOND TERMS.—Bayonet and Broad-Sword Exercise.
Dismounted Cavalry Tactics.

SENIOR YEAR.

FIRST AND SECOND TERMS.—Military Engineering; Field Fortifications.
Topographical Drawing.
Small-sword Exercise.

The classes for military instruction are interspersed through the different courses. All able-bodied students will be enrolled as a College Battalion, and drill as such once a week through the course.

LADIES' COURSE.

For the Freshman year the course is identical with the course in Agriculture.

SOPHOMORE YEAR.

FIRST TERM.—General Chemistry: Inorganic Chemistry.
Botany: Physics.
Latin: French. (*Optional.*)
English Literature. (*Optional.*)
Music: Drawing. (*Optional.*)

SECOND TERM.—General Chemistry.
Inorganic and Organic Chemistry, or Qualitative Analysis may be taken instead of Organic Chemistry.
Botany: Physics.
Latin: French. (*Optional.*)
Music: Drawing. (*Optional.*)
English Literature. (*Optional.*)

JUNIOR YEAR.

FIRST TERM.—Botany.
Latin: French. (*Optional.*)
Study of Words.
Landscape Gardening, with Topographical Drawing.
Music: Drawing. (*Optional.*)
History.

SECOND TERM.—Domestic Economy.
Study of Shakspeare.
Physics. (*Optional.*)
History.
Music: Drawing. (*Optional.*)

SENIOR YEAR.

FIRST TERM.—Psychology.
Comparative Anatomy and Physiology.
Mineralogy and Geology: Formation of Soils.

—Political Economy: Constitutional History and Law.
Human Anatomy, Physiology and Hygiene.
Meteorology.

NORMAL INSTRUCTION.

Normal instruction will be given by lectures during the closing month of each year upon the following subjects:—organization and government of schools; methods of teaching spelling, reading, geography, grammar, and arithmetic; object teaching. The above course will be accompanied with a rigid review of the common branches.

Any student may attend these lectures who expects to teach in the schools of the State during the winter vacation.

SUNDAY EXERCISES.

Prayers—7 o'clock, A. M.
Bible History, by Prof. Geddes—9 o'clock, A. M.
Meeting for singing sacred songs—11 o'clock, A. M.
Preaching in the College Chapel—3 o'clock, P. M.
Students' Prayer Meeting—7 o'clock, P. M.

Students are required to attend morning prayers, and services at 3 o'clock, P. M.; all other exercises optional. Those who desire, it may also attend some of the churches in Ames in the forenoon.

DEPARTMENTS OF INSTRUCTION.

MATHEMATICS.

The course of instruction in mathematics pre-supposes a thorough knowledge of arithmetic, and the rudiments of algebra so far as simple equations.

It occupies two and a half years for its completion, and may be divided into a Lower and a Higher course. The former occupies one and a half years, and embraces:

FRESHMAN YEAR.

First Term.—Algebra—Loomis' Treatise.
Second Term.—Plane, Solid and Spherical Geometry—Loomis.

SOPHOMORE YEAR.

First Term.—Plane Trigonometry, Mensuration, Plane and Topographical Surveying, and Leveling—Loomis.

The Higher Course occupies one year, and embraces:

Second Term.—Analytical Geometry—Church. Descriptive Geometry—Church.

JUNIOR YEAR.

First Term.—Differential and Integral Calculus—Church. Shades, Shadows and Perspective.—Church.

The Lower Course is designed to meet alike the wants of the agriculturist and the engineer. It gives so much mathematics as is necessary for the business man, the farmer and the mechanic; including all subordinate to book-keeping, the simpler kinds of engineering, particularly farm engineering, and the general study of science; and sufficient to inure the mind to the work, and give it the habits of vigorous logic. The Higher Course is designed to lay a broad and sure

foundation for the study of mechanics, and the higher departments of science, and for the more difficult problems of engineering.

The subjects are taught by text-books and daily recitations, accompanied by the free use of the black-board, by the solution of numerous problems, by lectures, and by carefully constructed drawings. In Surveying, students practice in the field with instruments two hours daily, by divisions, thoroughout the first term of the Sophomore year. They keep notes of their surveys, and from them make all necessary drawings, calculations and reports. In Descriptive Geometry, and Shades, Shadows and Perspective, students are taught the use of drawing instruments, and are required to construct carefully in India ink all important problems.

BOOK-KEEPING.

The instruction in Book-keeping is given in connection with the lessons and exercises in Bryant and Stratton's larger text-book. Each student opens and keeps a full set of books in double entry; writes business letters, contracts, receipts, bank checks, accounts of sales, bills of lading, and other business and legal papers; rules and keeps the various auxiliary books useful in different kinds of business; makes balanced statements; computes interest and percentage, partial payments, partnership and equation of payments, files and preserves vouchers, and in general does what he might do if in charge of the books of a large house, and complicated business. These books and papers are shown in class, compared and criticised. In addition, tri-weekly recitations are made upon the principles involved, and their application. To this subject are given three days per week for the first term of the Freshman Year.

PHYSICS.

The course of instruction in this department is as follows :

FRESHMAN YEAR.

Second term.—Laws of equilibrium of solids, liquids, and gases. Special attention will be given to the laws relating to the pressure of fluids, Mariotte's law, and specific gravity. Heat commenced.

SOPHOMORE YEAR.

First Term.—Heat completed. The course of instruction will embrace, expansion, with construction and use of thermometers, and application to structures, especially of iron; conduction, absorption and radiation, with their application to building, ventilation, and warming; formation of vapors, with practieal problems in relation to generation of steam; specific heat; determination of heating power of fuels, etc. etc.

Second Term.—Acoustics, including the detailed study of vibratory movements. Optics commenced.

JUNIOR YEAR.

Second Term.—Optics completed. This subject, as here taught will embrace—the detailed study of the phenomena of reflection, refraction, interference, and polarization, and the relation of these phenomena to the phenomena produced by vibrating bodies, with a view to the complete comprehension of the undulatory theory of light; also the construction and use of optical instruments, with exercises in calculating focal length of mirrors and lenses, designing achromatic combinations, etc. etc.

Dynamical electricity, magnetism and electro-magnetism, including electrical measurements, and the electric telegraph.

The exercises, which will consist of recitations from text-book, and lectures illustrated by experiment, will occur twice each week during the second term, Freshmen year, and first term, Sophomore year; three times each week during the second term, Sophomore year; and five times each week during the second term, Junior year. The room at present available, is not sufficient to permit all the students to perform the experiments individually, but a few may receive special instruction in the use and care of apparatus, and acquire some experience in physical manipulation by giving their assistance in the apparatus room.

Text-book—Atkinson's Ganot.

MECHANICS, AND ITS APPLICATIONS.

JUNIOR YEAR.

The course of instruction in this subject is as follows:

First Term—Theoretical Mechanics: Representation and measurement of forces; composition and resolution of forces; principles of moments and virtual moments; theory of parallel forces; center of gravity.

Elementary Machines: Friction and other resistances.

General Equations of Motion: Motion in straight lines; uniform and varied motion; curvilinear motion; centrifugal force; moment of inertia; laws of impact; center of percussion.

Work: Work done in overcoming resistances; work done in overcoming inertia; accumulation of work; measurement of work done by motors, and consumed by various machines.

Mechanics of Fluids: Laws of pressure; center of pressure; buoyancy and flotation; tension and elasticity of gases and vapors.

Flow of Liquid: Through orifices, over weirs, in pipes, and open channels; living force of liquids.

Second Term—Applied Mechanics: Stability of structures; equilibrium of arches; trussed roofs and bridges; suspension bridges; tubular bridges.

Strength of materials: Resistance to extension and compression; resistance to shearing; resistance to flexure; resistance to torsion; exercises in designing beams, trusses, etc., to support a given load.

SENIOR YEAR.

First Term.—Theory of Motors: Overshot, undershot, and breast wheels; turbines; steam engines; hot air engines; gas engines; exercises in designing motors for a given duty; determination of efficiency of steam engine by means of the indicator and dynamometer.

Second Term.—Study of Machines: Toothed wheels; eccentrics; cams; screws; link work; regulating apparatus.

Efficiency of machines; strength of machinery; strength of bands, axles, shafts, pulleys, and teeth of wheels; exercises in designing parts of, and complete machines to fulfill given conditions.

The students in the Mechanic Arts will have an opportunity to spend the work hours of the Sophomore, Junior, and Senior years in the work-shop, where they will see and practice a great variety of mechanical operations. It is expected that with the advantages of theoretical knowledge and mental culture obtained in the class-room, this amount of practice will go far towards making them skilled workmen, and that they will gain such a knowledge of the resources of the mechanic, and the methods of doing work, as will be of the greatest advantage to them as draughtsmen, engineers, or architects.

Text-books and Books of Reference.—Theoretical Mechanics, *Peck;* Applied Mechanics, *Rankine;* Machinery and Millwork, *Rankine;* The Steam Engine and other Prime Movers, *Rankine;* Mechanics of Engineering, *Weisbach.*

MECHANICAL DRAWING.

After completing the course in Descriptive Geometry, and Shades, Shadows, and Perspective, the students in the mechanical courses will during the remainder of the Junior year, practice shading and tinting with India ink, and drawing from models with a view to the production of finished pictures.

During the Senior year the students in Mechanical Engineering will make drawings of machines from measurements, as well as drawings, complete and in detail, of their designs.

CHEMISTRY.

The course in Chemistry extends throughout two years, as follows:

Sophomore Year—First Term. General Chemistry.—Recitations from text-book and lectures, three times a week. Laboratory practice two afternoons a week. While the value of interesting and instructive lectures, illustrated by brilliant experiments, is appreciated, it is recognized that the clearness and sharpness of knowledge imparted by recitations from a text-book cannot be dispensed with. Both of these agencies are used, and their good effects are

hightened by a series of over three hundred and sixty experiments performed by each student at his own table. Indelible ink, spirits of hartshorn, sal-volatile, gunpowder, &c., &c., are manufactured by each student, and while the facts, laws and theories of Inorganic chemistry are so firmly fixed in the mind that they will never be forgotten, processes are learned which will be of daily use in practical life.

Text-book—Eliot & Storer's Manual.

Second Term—Theoretical Chemistry.—Two lectures a week for eight weeks in the beginning of the term. Abstracts of these lectures are copied by the student into his note-book, and recited at the next meeting of the class. In these lectures the student reviews the laws and theories of general chemistry, securing thus a sure foundation for a thorough knowledge of the subject.

Review of Eliot and Storer's Manual.—Two exercises a week for eight weeks.

Qualitative Analysis.—Three afternoons a week throughout the term. Each student is given a series of substances for analysis, such as salt, type-metal, wood and coal ashes, mineral paints, nickel coin, soda, &c., &c., the solution of these problems by means of the blowpipe, and reagents, fitting him for the analysis of all inorganic substances. Here, as during his laboratory practice the preceding term, the student is required to make a full and accurate record of his work, to write out all the reactions which take place in his experiments, and to submit the same from time to time to the professor of chemistry for examination and correction. At the close of the term he is given for analysis an unknown compound containing twenty bases and acids ; the analysis to be made within a given time, and without the aid of the text-book.

Junior Year.—First Term. Organic Chemistry, by lectures, recitations and laboratory practice. The necessity for laboratory practice as a means of fixing the laws, facts, and theories of the science, is just as great in organic, as it is in inorganic chemistry and the processes involved have even a closer bearing upon the affairs of everyday life. Soaps of different kinds are made; sugar is made out of sawdust; starch is extracted from grain and potatoes; nitro-glycerine is made from glycerine, which

itself had been extracted from fat; ether, chloroform, chloral, &c., &c., are manufactured.

Text-book, Miller's Organic Chemistry.

Quantitative Analysis, commenced.

Second Term—Agricultural Chemistry, by lectures and recitations, two exercises a week throughout the term. The topics treated of, include the ash of plants, the atmosphere as related to plants, the soil as related to vegetation, the action and proper application of manures.

Analysis of Soils and Manures.—Laboratory practice two afternoons a week throughout the term.

Text-books for the Term.—" How Crops Grow," and " How Crops Feed," by Johnson; and Caldwell's " Agricultural Chemical Analysis."

NOTE—In the ladies' course, Organic Chemistry is substituted for Qualitative Analysis during the second term of the Sophomore year, and Chemistry as Applied to Domestic Economy is substituted for Agricultural Chemistry in the second half of the Junior year. In the Chemistry of Household Life, lectures are given upon the chemical agents used in the preservation of meats, fruits, and vegetables, and the changes produced by these agents; the chemical changes which take place in the boiling, baking, and roasting of various articles of food; technical chemistry of beverages.

BOTANY.

The course in Botany occupies one year and a half, extending throughout the whole of the Sophomore, and one half of the Junior year. During the first year of the course, students acquire a knowledge of the principles of Structural Botany from the study of " Gray's Lessons," as well as by actual dissection and analysis of plants. Systematic Botany is taken up as soon as the student is far enough advanced to do so, and carried through the year, each student being required to collect, press, mount, and name at least one hundred species of plants.

In the Junior year Vegetable Physiology, Economic Botany, and the Elements of Cryptogamic Botany are pursued in succession,

about an equal time being devoted to each. In the illustration of the subject, the College Herbarium affords examples of the more rare forms, while for minute structure a good microscope is in daily use.

HORTICULTURE.

Besides the practical instruction given students while engaged in work on the Garden, the following subjects are taken up in the class-room: Hot-bed culture; the kitchen garden, its general management, the kinds of vegetables, methods of culture, &c.; market gardening.

Students taking this course spend much of their working time in the garden, under the personal supervision of the Superintendent.

POMOLOGY.

The general principles of the subject are studied by text-book and lectures, in the second term of the Sophomore year. The processes of grafting, budding, and pruning are taught, and illustrated by requiring every member of the class not only to witness the operation, but also to actually graft, bud and prune for himself or *herself*, as the case may be.

Vineyard culture, and the culture of small fruits, are studied in their turn, while a great part of the time is given to the subject of orcharding, including the culture of apples, pears, plums, cherries, etc.

The practical work in this department consists of labor in the vineyard, small-fruit garden, nursery and orchard, under the Professor of Pomology.

MILITARY TACTICS AND ENGINEERING.

This department, established pursuant to act of Congress, will be sustained in conformity with United States Army regulations. The course includes the following branches of study:

Military Engineering—Field fortifications; Military Constructions; Topographical Drawing.

Military Tactics.—Infantry, Cavalry, Artillery, Bayonet, Broad and Small-sword exercise.

Military Law.—Practice of Courts Martial, United States Army Regulations.

Practical instruction will be given in some one of the different arms of the service each day through the week. Inspection of arms and accoutrements every Friday, with dress-parade for the college battalion.

The following branches will be taught through the successive collegiate years:

Freshman.—Schools of the soldier and company.

Sophomore.—Field artillery.

Junior.—Bayonet and broad-sword exercise; dismounted cavalry tactics.

Senior.—Field fortifications. Topographical drawing. Small-sword exercise. All able-bodied male students of the college are expected to drill in their respective classes; also, in the college battalion once a week. Students will uniform themselves in accordance with the approved pattern.

POLICY OF INSTRUCTION.

It is in keeping with the purpose and spirit of the Agricultural College that up to the limit of its capacity, it should give help and instruction to the youth of the State who are prepared to enter its courses, and whose places of residence are properly distributed. It would evidently be a misapplication of the national fund, if the College were to do the work of the district schools which are already provided for by the State. The Faculty therefore require of every candidate as a condition of entrance, that he shall have mastered the common branches especially, as proficiency in these essential to the successful prosecution of the higher branches taught in the several courses of study.

Some facts which three years of experience have furnished, as to the degrees of benefit derived by different students from the advantages they enjoy at the College, are worthy of notice. The Freshman class is always large, but from failure of funds or health, lack of earnestness, or other causes over half of its numbers drop out at the close of the year—some indeed leaving at the close of the first term. The further reduction in numbers which takes place as

the classes advance to the Senior year, makes it safe to calculate that the College will graduate but one fourth of those who enter the Freshman class.

Now of course, those who withdraw before completing any of the courses of study receive a degree of benefit proportionate to their actual progress, but the highest profit is gained from the advantages which the College offers, by those who hold out to the end. While therefore it is our manifest duty to give thorough instruction to all, and so do the greatest good to the greatest member, it is especially in harmony with the objects of the College, that we multiply all the inducements which will increase the number of our graduates. These will represent to the State the excellence or defects of our college system. They will become the exponents of whatever of value there is in industrial education—its earliest and most genuine fruits. For this reason, among others, the facilities for instruction, while they should be adequate to the wants of the Freshman year, ought to be made more ample for each succeeding year, and should attain great variety and completeness in the final one. Books of reference, illustrative apparatus, models, and full collections of specimens of Natural Science are specially needful in the advanced studies which the Seniors pursue, and lack of such facilities has in many colleges much to do with the disparity of numbers between the Senior Class and the Freshman.

As a further incentive in this direction, I would urge that the Trustees ask the Legislature to grant them authority, by enactment, to confer suitable degrees upon any young men and women that the faculty shall recommend as having finished one of the courses of study, or such prominent studies selected from two or more of them, as shall in their opinion be equivalent to a single course.

Let me commend to the Board a much smaller class of students who desire not to pursue a full course, but to gain the mastery of some special line of study, such as Botany, or Chemistry, or Surveying. For the encouragement of such I suggest, after consulting the faculty, that the President be authorized to grant, for unusual attainments in any particular branch, certificates of proficiency, signed by the professor who has such branch in charge, and countersigned by himself. This Agricultural College—the child of the State—the

school of the farmer and the mechanic, ought to extend the helping hand to all classes of students who are thoroughly in earnest to help themselves.

FARMERS' INSTITUTES.

The experiment of holding Farmers' Institutes in different localities in the State, for the purpose of giving familiar lectures on prominent topics in agriculture, was tried last winter, with very gratifying results. Institutes lasting three days were held at Cedar Falls, Council Bluffs, Washington, and Muscatine, at each of which points we found an enthusiastic gathering of farmers. The attendance at Washington numbered over two hundred and fifty, and the Institute at Muscatine has become a permanent organization, meeting, as I am informed, once a month.

Many requests have come in from various localities for Farmers' Institutes this winter. My correspondence on the subject is quite large, and I have already arranged for four, viz.: one at Nevada, beginning on the 19th instant, one at Wilton on the first Wednesday of January, one at Vinton, opening on the second Tuesday of February, and another at Manchester or Delaware Centre, Delaware county, opening on the last Wednesday of January. Three more are to be disposed of, for which there are numerout applications. Those desirous of securing one of these for their county, forward to me a request to that effect, signed by not less than fifty farmers who pledge their personal attendance and the payment of such traveling expenses as we cannot avoid making.

Subjoined to this report will be found the programme of the winter series of Farmers' Institutes, the Catalogue of students, a list of donations, the time table and calendar for 1872.

All of which is respectfully submitted.

A. S. WELCH,
President.

PROGRAMME FOR FARMERS' INSTITUTE.

FIRST DAY—MORNING.

10:00 A. M. *Lecture.*—The Beef Animal.
10:30 A. M. Questions and discussion.
11:00 A. M. *Lecture.*—Fruit Culture.
11:30 A. M. Questions and discussion.

AFTERNOON.

2:00 P. M. *Lecture.*—Swine.
2:30 P. M. Questions and discussion
3:00 P. M. *Lecture.*—Stock Breeding.
3:30 P. M. Questions and discussion.
4:00 P. M. *Lecture.*—Fruit Culture.
4:30 P. M. Questions and discussion.
7:00 P. M. Evening lecture.

SECOND DAY—MORNING.

10:00 A. M. *Lecture.*—Swine.
10:30 A. M. Questions and discussion.
11:00 A. M. *Lecture.*—Stock Breeding.
11:30 A. M. Questions and discussion.

AFTERNOON.

2:00 P. M. *Lecture.*—Fruit Culture.
2:30 P. M. Questions and discussion.
3:00 P. M. *Lecture.*—Bee Culture.
3:30 P. M. Questions and discussion.
4:00 P. M. *Lecture.*—Preparation of Ground for Crops.
4:30 P. M. Questions and discussion.
7:00 P. M. *Lecture.*- Tree Culture.

THIRD DAY—MORNING.

10:00 A. M. *Lecture.*—Staple Crops.
10:30 A. M. Questions and discussion.
11:00 A. M. *Lecture.*—Small Fruits.
11:30 A. M. Questions and discussion.

AFTERNOON.

2:00 P. M. *Lecture.*—The Milch Cow.
2:30 P. M. Questions and discussion.
3:00 P. M. *Lecture.*—Education and management of the Horse.
3:30 P. M. Questions and discussion.
4:00 P. M. *Lecture.*—Bee Culture.
4:30 P. M. Questions and discussion.
7:00 P. M. *Lecture.*—Agricultural Education.

CATALOGUE OF STUDENTS, 1871.

JUNIOR CLASS.

NAME.	COURSE.	POST-OFFICE.	COUNTY.
Arthur, J. C	Agricultural	Charles City	Floyd
Brown, Preston S	Agricultural	Fayette	Fayette
Carter, James	Mechanical	Ottumwa	Wapello
Cessna, Orange	Agricultural	Nevada	Story
Churchill, Seiden A	Agricultural	Davenport	Scott
Devin, George	Mechanical	Des Moines	Polk
Dickey, Shannon H	Mechanical	Mt. Pleasant	Henry
Dietz, Charles N	Agricultural	Anamosa	Jones
Foster, Luther	Mechanical	Ottumwa	Wapello
Fuller, Harry	Agricultural	Ottumwa	Wapello
Harvey, Francis L	Agricultural	Springvale	Humboldt
Hayward, William C	Mechanical	Forest City	Winnebago
Howard, Charles G	Mechanical	Decorah	Winneshiek
Hungerford, Edgar M	Agricultural	Ottumwa	Wapello
Locke, Mattie E	Agricultural	Vinton	Benton
Macomber, John K	Agricultural	Lewis	Cass
Marshall, Miller F	Mechanical	Knoxville	Marion
Noyes, Laverne W	Agricultural	Springville	Linn
Page, Henry L	Mechanical	Montana	Boone
Patrick, Walter H	Agricultural	Independence	Buchanan
Prime, Mary A	Agricultural	Ames	Story
Ramsey, George W	Agricultural	Winthrop	Buchanan
Smith, Charles A	Mechanical	Camanche	Clinton
Smith, Irving W	Agricultural	Charles City	Floyd
Spencer, Henry C	Agricultural	Grinnell	Poweshiek
Stanton, Edgar W	Mechanical	Ames	Story
Stevens, John L	Mechanical	Lamoile	Marshall
Suksdorf, Charles L	Agricultura	Walcott	Scott
Swafford, C. G	Mechanical	Solon	Johnson
Thompson, Tom L	Agricultural	West Union	Fayette
Tillotson, Charles H	Mechanical	Ames	Story
Wellman, Calvin P	Agricultural	Forest City	Winnebago
Wells, John M	Mechanical	Nevada	Story

SOPHOMORE CLASS.

NAME.	COURSE.	POST OFFICE.	COUNTY.
Baker, Warren C.	Agricultural	Ames	Story
Beard, Edgar L	Agricultural	Frankville	Winneshiek
Brown, James E.	Mechanical	Garnavillo	Clayton
Burnham, Geo. W.	Mechanical	Waukon	Allamakee
Carlton, E. D.		Red Oak	Montgomery
Carter, Lucy A.	Ladies'	Prairie City	Jasper
Dungan, Horace G.	Mechanical	Chariton	Lucas
Edson, Ena E.	Ladies'	Blairstown	Benton
Flower, George	Agricultural	Addison	Humboldt
Garst, Charles E.		Montana	Boone
Granger, A. H.	Mechanical	Elkader	Clayton
Hardy, Benjamin R.	Agricultural	Swede Point	Dallas
Hardy, Sarah E.	Ladies'	Swede Point	Dallas
Harvey, Geo. W.	Agricultural	Toledo	Tama
Hawkins, Allen M.	Mechanical	Ottumwa	Wapello
Hoyt, Nora A.	Ladies'	Camanche	Clinton
Hunt, Nina	Ladies'	Sioux City	Woodbury
Kellogg, Theodore D.	Agricultural	Ames	Story
Kent, David A.	Agricultural	Elkhart	Polk
Krater, Kate	Ladies'	Algona	Kossuth
Lee, John S.	Agricultural	Eagle	Bremer
Lull, Geo. M.	Agricultural	Greeley	Delaware
Maben, Charles B.	Agricultural	Concord	Hancock
Marshall, Richard J.	Agricultural	Ames	Story
McIntire, W. A.	Agricultural	Ottumwa	Wapello
Pipher, John	Agricultural	Avon	Polk
Raybourn, Hattie E.	Ladies'	Swede Point	Dallas
Redlingshafer, Lizzie A.	Ladies'	Chariton	Lucas
Richards, Fannie H.	Ladies'	Webster City	Hamilton
Richmond, Alfred		Ames	Story
Roberts, Abe	Agricultural	Des Moines	Polk
Robinson, W. O.	Agricultural	Vinton	Benton
Scott, Warren M	Agricultural	Montana	Boone
Shankland, Edward C.	Mechanical	Dubuque	Dubuque
Sprague, Henry M.	Agricultural	Jefferson	Greene
Stalker, Millikan	Agricultural	Richland	Keokuk
Stalker, Sarah	Ladies'	Richland	Keokuk
Whitney, Wm. H.		Bowen's Prairie	Jones
Williams, Herrick	Mechanical	Huron	Des Moines
Young, Clara M.	Ladies'	Vinton	Benton

FRESHMAN CLASS.

NAME.	POST-OFFICE.	COUNTY.
Adams, Albert G.	Fairfield	Jefferson
Adkins, Arminta	Carlisle	Warren
Allen, Clara A.	Clear Lake	Cerro Gordo
Bacon, William H.	Washington	Washington
Baker, George R.	Castalia	Winneshiek
Baldwin, Thomas B.	Council Bluffs	Pottawattamie
Ballard, Martha	Hook's Point	Hamilton
Barnum, John A.	Cedar Falls	Black Hawk
Baum, Charles L.	Chariton	Lucas
Beard, Hammond	Frankville	Winneshiek
Bebout, Estella J.	Eddyville	Wapello
Bennett, Sarah J.	Washington	Washington
Beitler, Sallie	Davenport	Scott
Bettys, Franklin M.	Prairie Hill	Boone
Boardman, Charles D.	Lyons	Clinton
Bradford, Evaline	Vernon	Van Buren
Buchanan, Robert W.	Mt. Pleasant	Henry
Burleson, Myron C.	Maquoketa	Jackson
Carter, Kate M.	Prairie City	Jasper
Chamberlain, Asa A.	Cambridge	Story
Chamberlain, Albert P.	Cambridge	Story
Clingan, Eugene	Vinton	Benton
Clingan, Charles E.	Vinton	Benton
Cochran, William H.	Northville	Greene
Colclo, Mary A.	Carroll	Carroll
Compton, Hugh	Ames	Story
Conway, John W.	Lansing	Allamakee
Daniels, George H.	Homer	Hamilton
Davis, Valoris W.	Jesup	Buchanan
Day, Horace G.	Chariton	Lucas
De Hart, Thomas J.	Vernon	Van Buren
Devin, Sarah	Des Moines	Polk
Dixon, Hattie A.	Clinton	Clinton
Dudley, Winnifred	Ames	Story
Dudley, Charles S.	Agency City	Wapello
Eastwood, Mary	Ontario	Story
Eastwood, George	Ontario	Story
Elder, Walter	Upper Grove	Hancock
Elston, Thomas N.	Kossuth	Des Moines
Eslick, Thomas B.	Homer	Webster
Evans, Lafayette	Ames	Story
Felkner, Orange O.	Vinton	Benton
Fenton, George E.	Nevada	Story
Fitchpatrick, Sarah	Ames	Story
Flower, Ellen	Springvale	Humboldt
Frazee, William	Mechanicsville	Cedar
Gardner, Frank W.	Chariton	Lucas
Garton, Naomi	Carlisle	Polk
Grafe, Sarah	Pella	Marion
Granger, William D.	Elkader	Clayton
Grant, James B.	Davenport	Scott
Hambleton, Sallie	Nevada	Story
Haskall, Charles H.	Bridgeport	Jackson
Hastings, Charles P.	Muscatine	Muscatine
Hoggatt, Ella	Ames	Story
Iles, Thomas H.	Davenport	Scott

FRESHMAN CLASS.—CONTINUED.

NAME.	POST-OFFICE.	COUNTY.
Isaman, S. G.	Hillsborough	Lee
Jackson, F. D.	Jesup	Buchanan
Johnson, Orville C.	Carroll	Carroll
Kendall, John	Moingona	Boone
Kerr, Eugene H.	Washington	Washington
Kiesel, G. W.	Guttenburg	Clayton
Kinsel, John W.	Nevada	Story
Lamoreux, William R.	Sac City	Sac
Lane, Emma	Dunlap	Crawford
Lansing, Oscar J	Ames	Story
Lawton, Louisa	Lyons	Clinton
Lee, Thos. F.	Eagle	Breme
Litteer, Monroe	Bedford	Taylor
Lowe, Peter P.	Keokuk	Lee
Lyman, Hannah	Boonsboro	Boone
Lyon, Geo. B.	Maquoketa	Jackson
Maben, J. D	Concord	Hancock
Macomber Geo. A	Lewis	Cass
Marsh, G. Earl	Jesup	Buchanan
Mathews, Adelaide	Knoxville	Marion
Matter, C. C.	Blairstown	Benton
McCartney, Geo. A	Vinton	Benton
McCray, Orlando P.	Trenton	Henry
McElyea, Charles W	Ames	Story
McFadden, Geo. B	Ames	Story
McGuire, Mary E.	Colo	Story
McMeekan, Eliza J.	De Witt	Clinton
Messmore, Sarah E	Moingona	Boone
Miller, Andy W.	Prairie Hill	Boone
Mitchell, Frank P	Maquoketa	Jackson
Mitchell, Parker W	Nevada	Story
Nash, Stephen C.	Cherokee	Cherokee
Nelson, N. P	Bedford	Taylor
Nichols, Julius H.	Grant City	Sac
Nye, Chas. A.	De Witt	Clinton
Packard, Benjamin H.	Red Oak	Montgomery
Palmer, Mary A	Ogden	Boone
Palmer, Thomas L	Washington	Washington
Patrick, Herbert W.	Independence	Buchanan
Parsons, A. A	Fayette	Fayette
Peterson, Chas. E.	Panora	Guthrie
Porterfield, Harriet	Knoxville	Marion
Potter, Adelaide E.	Nevada	Story
Pyne, Edward A.	Vinton	Benton
Quiggle, Lewis C.	Des Moines	Polk
Randleman, Winfield R	Carlisle	Warren
Rankin, John Q. A.	Des Moines	Polk
Rice, Wm.	Avon	Polk
Robinson, Minnie	Vinton	Benton
Shepherd, Edwin T.	Ames	Story
Sigafoose, Russell B	Crawfordsville	Washington
Simmons, Robert O	Boonsboro	Boone
Smith, Ida E	Charles City	Floyd
Smith, Chas. H.	Jesup	Black Hawk
Smith, Wm. R.	Davenport	Scott
Steere, Robert W.	Muscatine	Muscatine
Stough, Victor H.	Algona	Kossuth

FRESHMAN CLASS.—CONTINUED.

NAME.	POST-OFFICE.	COUNTY
Stumbaugh, Letitia	Lyons	Clinton
Suksdorf, Philip	Walcott	Scott
Thompson, James G	Ontario	Boone
Tupper, Kate W	Brighton	Washington
Waite, Altana D	Boone	Boone
Wallace, John E	Davenport	Scott
Wattles, Mason J	Glidden	Carroll
West, Flave	Ames	Story
Wheeler, Emma	Denison	Crawford
Wheeler, Julia	Blairstown	Benton
Whittaker, Joseph R.	Hook's Point	Hamilton
Worthington, David H	Fairfield	Jefferson
Wright, Alonzo B.	Des Moines	Polk
Wright, Frank P.	Chariton	Lucas
Yates, Samuel Y.	Stanwood	Cedar

STUDENTS NOT FULLY ACCEPTED AS FRESHMEN.

NAME.	POST-OFFICE.	COUNTY.
Allen, Albert B.	Clear Lake	Cerro Gordo
Barker, Mary A	Knoxville	Marion
Beery, Isaac N.	Mt. Pleasant	Henry
Colclo, Craton C.	Carroll	Carroll
Compton, Clara E.	Ames	Story
Danforth, Fred C.	Charles City	Floyd
Dudley, George	Ames	Story
Ellis, Wm. R.	Panora	Guthrie
Haycock, Junnie B	Richland	Keokuk
Hogue, Romeo G.	Chariton	Lucas
McPherson, James	Boone	Boone
Miller, Nora E.	Knoxville	Marion
Page, Irene A.	Nevada	Story
Porterfield, Frank W	Council Bluffs	Pottawattamie
Roberts, Mary	Ames	Story
Shearer, Isabella S.	Ames	Story
Waterman, Clara A.	Ames	Story
Welch, Genevieve	Ames	Story
Welch, Wm. B.	Ames	Story

SUMMARY.

Juniors	33
Sophomores	40
Freshmen	128
Freshmen (in part)	19
Total	220

LIST OF DONATIONS TO THE COLLEGE.

1870 AND 1871.

One lot ornamental plants.....Samuel Bower, Cedar Rapids.
One lot rhubarb roots, two varieties.. " " " "
Fifty roots Canada Black-cap raspberry " " " "
One lot ornamental trees and shrubs,
H. C. Raymond, Council Bluffs.
Two lots field and garden seeds,
Department Agriculture, Washington, D. C.
One hundred rhubarb roots.....Mathews & Son, Knoxville.
Two lots garden seeds.....Landreth & Son, Philadelphia, Pa.
One lot seeds.....H. W. Bessey, Seville, O.
Fifty roots Ellisdale raspberry.....H. A. Terrey, Crescent City.
Regulator seed drill.....Sleight & Ketchum, Marshalltown.
Advance Reaper and Mower, all but $100.00,
McCormick Bros., Chicago, Ill.
Burdick Reaper, in part.....D. M. Osborne & Co., Auburn, N. Y.
Kirby two-wheeled Mower, in part,
D. M. Osborne & Co, Auburn, N. Y.
Blanchard Churn.....Sleight & Ketchum, Marshalltown.
Doty Washing Machine..... " " "
Clipper Mower, (one horse).....Clipper Manufacturing Co., N. Y.
Industrial Plow.....Industrial Plow Co., St. Louis, Mo.
Godfrey Plow.....Moline Plow Co., Moline, Ill.
Plow.....John Deere, Moline, Ill.
Corn Harrow and Cultivator.....A. M. Bakewell, Normal, Ill.
American Bee Hive.....Mrs. E. S. Tupper, Brighton, Iowa.
One lot seed corn.....Mr. Wilson, Ames.
One barrel Bromophyte....Bromophyte Manuf'g Co., Chicago, Ill.
Specimens Celestine, Selenite and calcareous Tufa.
B. F. Gue, Ft. Dodge.
Quartz Geode.....O. H. P. Buchanan, Mt. Pleasant.

One lot specimens for Herbarium,.....H. C. Spencer, Grinnell.
One lot specimens for Herbarium.....C. A. Smith, Camanche.
One copy Dubuque Daily Times.....The proprietors, Dubuque.
One copy Country Gentleman.....The proprietors, Boston, Mass.
Monthly Reports of the Department of Agriculture,
The Commissioner, Washington, D. C.
Methodist Recorder.....The proprietors, Pittsburgh, Pa.
Cattle Portraits.....J. H. Pickrell, Harristown, Ill.
" " .....Walcott & Campbell, New York Mills, N. Y.
" " .....George Murray, Racine, Wis.
" " .....J. H. Spears, Tallula, Ill.
One Ayrshire calf.....S. G. Livermore, Robin, Iowa.
One lot minerals from Sandwich Islands,
Geo. W. Bassett, Ft. Dodge, Iowa.
One lot Ft. Dodge minerals.....Geo. W. Bassett, Ft. Dodge, Iowa.
Two hundred specimens minerals from the United States and Europe,
Dr. A. E. Foote.

TIME. TABLE

SPRING TERM—FORENOON.

FRESHMAN CLASS.

TIME.	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12
Monday	Labor.	Labor.	Labor.	Study	Study.
Tuesday	Labor.	Labor.	Labor.	Study	Study.
Wednesday.	Labor.	Labor.	Labor.	Study	Study.
Thursday.	Labor.	Labor.	Labor.	Study	Study.
Friday	Labor.	Labor.	Labor.	Study	Study.

SOPHOMORE CLASS.

Monday	Study	Botany	Trig'ty & Surv*	Language	Gen. Chem.
Tuesday	Drill	Physics	"	"	Agriculture
Wednesday.	Study	Botany	"	"	Gen. Chem.
Thursday	Study.	Physics	"	"	Agriculture.
Friday	Study.	Botany	"	"	Gen. Chem.

JUNIOR AGRICULTURISTS.

Monday	Organ. Chem.	Organ. Chem.	Organic Chem.	Land. Garden'g	Botany
Tuesday	"	"	"	Agriculture	"
Wednesday.	"	"	"	Land. Garden'g	"
Thursday	Drill	"	"	Organ. Chem.	"
Friday	Organ. Chem.	"	"	Land. Garden'g	"

JUNIOR ENGINEERS.

Monday	Study	Calculus	Study	Land. Garden g	Mechanics.
Tuesday	"	"	"	Study.	"
Wednesday.	"	"	"	Land. Garden'g	"
Thursday.	Drill	"	"	tudy	"
Friday	Study.	"	"	Land. Garden'g	"

SENIOR CLASS.

Monday	Labor.	Labor.	Labor.	Study.	Psychology
Tuesday	"	"	"	"	"
Wednesday.	Drill	"	"	"	"
Thursday	Labor.	"	"	"	"
Friday	"	"	"	"	"

*The class in Surveying is divided into sections for weekly practice in the field. This exercise takes the place of labor for the time being, and lasts from 1 to 3 p. m.

FOR 1872.

SPRING TERM—AFTERNOON.

FRESHMAN CLASS.

1 to 1:30	1:30 to 2:15	2:15 to 3	3 to 3:45	3:45 to 4:45	7 to 10	TIME.
	Language	Book-keep'g.	Algebra.	Elocution.	Study.	Monday
	"	Study	"	Drawing.	"	Tuesday
	"	Book-keep'g.	"	Drill	"	Wednes'y.
	"	Study	"	Drawing	"	Thursday.
	"	Book-keep'g.	"	Penmanship	"	Friday

SOPHOMORE CLASS.

Labor.	Labor.	Labor.	Labor.	Labor.	Study.	Monday
Expr. Chem.	Expr. Chem.	Expr. Chem.	Expr. Chem.	Expr. Chem.	"	Tuesday
Labor.	Labor.	Labor.	Labor.	Labor.	"	Wednes'y.
Expr. Chem.	Expr. Chem	Expr. Chem.	Expr. Chem.	Expr. Chem	"	Thursday.
Labor.	Labor.	Labor.	Labor.	Labor.	"	Friday

JUNIOR AGRICULTURISTS.

Labor.	Labor	Labor	Labor	Study.	Study.	Monday
"	"	"	"	"	"	Tuesday
"	"	"	"	"	"	Wednes'y.
"	"	"	"	"	"	Thursday.
"	"	"	"	"	"	Friday

JUNIOR ENGINEERS.

Labor	Labor	Labor	Labor	Labor	Study.	Monday
Geom. Draw.	Geom. Draw	Geom. Draw.	Geom. Draw.	Geom. Draw	"	Tuesday
Labor	Labor	Labor	Labor	Labor	"	Wednes'y.
Geom. Draw.	Geom. Draw.	Geom. Draw.	Geom. Draw.	Geom. Draw	"	Thursday.
Labor	Labor	Labor	Labor	Labor	"	Friday

SENIOR CLASS.

	Min. & Geol.	Study	Study	Professional	Study.	Monday
	"	"	"	Lectures	"	Tuesday
	"	"	"	and	"	Wednes'y.
	"	"	"	Studies†	"	Thursday.
	"	"	"		"	Friday

†In Agriculture—Comparative Anatomy and Physiology, Management of Crops and Stock.

In Horticulture—Comparative Anatomy and Physiology, Flowers and Flowering Plants, Soils for Different Fruits.

In Mechanical Engineering—Theory of Machines, and Machine Drawing.

In Civil Engineering—Civil Constructions, Railroad Surveying, and Bridge Building.

In Mining Engineering—Quantitative Analysis and Metallurgy.

Architecture—History, and Principles of Architecture, Detailed Study of the Orders.

FALL TERM—FORENOON.

TIME.	7 to 8	8 to 9	9 to 10	10 to 11	11 to 12
FRESHMAN CLASS.					
Monday	Labor.	Labor	Labor	Study	Study
Tuesday	"	"	"	"	"
Wednesday	"	"	"	"	"
Thursday	"	"	"	"	"
Friday	"	"	"	"	"
SOPHOMORE AGRICULTURISTS.					
Monday	Study	Zoology	Physics	Study	Gen. Chemistry
Tuesday	Drill	"	Botany	Stock Breeding	Study
Wednesday	Study	"	Physics	Study	Gen. Chemistry
Thursday	"	"	Botany	Stock Breeding	Study
Friday	"	"	Physics	Study	Gen. Chemistry
SOPHOMORE ENGINEERS.					
Monday	Study	Anal. Geom.	Physics	Study	Gen. Chemistry
Tuesday	Drill	"	Study	"	Descript. Geom
Wednesday	Study	"	Physics	"	Gen. Chemistry
Thursday	"	"	Study	"	Descript. Geom
Friday	"	"	Physics	"	Gen. Chemistry
JUNIOR AGRICULTURISTS.					
Monday	Study	Physics	Study	Eng. Literature	Farm Engineering
Tuesda	"	"	Study	Agri. Chemistry	
Wednesday	"	"	"	Eng. Literature	Farm Engineering
Thursday	Drill	"	Study	Agri. Chemistry	
Friday	Study	"	"	Eng. Literature	Farm Engineering
JUNIOR ENGINEERS.					
Monday	Study	Physics	Study	Eng. Literature	Mechanics
Tuesday	"	"	"	Study	"
Wednesday	"	"	"	Eng. Literature	"
Thursday	Drill	"	"	Study	"
Friday	Study	"	"	Eng. Literature	"
SENIOR CLASS.					
Monday	Labor.	Labor	Labor.	Study	Constitutional Law
Tuesday	"	"	"	"	Polit. Economy
Wednesday	Drill	"	"	"	Constitutional Law
Thursday	Labor.	"	"	"	Polit. Economy
Friday	"	"	"	"	Constitutional Law

NOTE.—The Junior Agriculturists will recite in Farm Engineering the fifth hour during the first half of the term, and in Farm Architecture the last half.

FALL TERM—AFTERNOON.

1 to 1:30	1:30 to 2:15	2:15 to 3	3 to 3:45	3:45 to 4:45	7 to 10	TIME.
FRESHMAN CLASS.						
	English Lit.	Physiology	Geometry	Elocution	Study	Monday
	"	Physics	"	Drawing	"	Tuesday
	"	Physiology	"	Drill	"	Wednes'y.
	"	Physics	"	Drawing	"	Thursday
	"	Physiology	"	Penmanship	"	Friday
SOPHOMORE AGRICULTURISTS.						
Labor	Labor	Labor	Labor	Labor	Study	Monday
Anal. Chem.	Anal. Chem.	Anal. Chem.	Anal. Chem.	Anal. Chem.	"	Tuesday
Labor	Labor	Labor.	Labor	Labor	"	Wednes'y.
Anal. Chem.	Anal. Chem.	Anal. Chem.	Anal. Chem.	Anal. Chem.	"	Thursday
Labor	Labor	Labor	Labor	Labor	"	Friday
SOPHOMORE ENGINEERS.						
Labor	Labor	Labor	Labor	Labor	Study	Monday
Anal. Chem.	Anal. Chem.	Anal. Chem.	Anal. Chem.	Anal. Chem.	"	Tuesday
Labor	Labor	Labor	Labor	Labor	"	Wednes'y.
Anal. Chem.	Anal. Chem.	Anal. Chem.	Anal. Chem	Anal. Chem.	"	Thursday
Labor	Labor	Labor	Labor	Labor	"	Friday
JUNIOR AGRICULTURISTS.						
Chem. Anal.	Chem. Anal.	Chem. Anal.	Chem. Anal.	Chem. Anal.	Study	Monday
Labor	Labor	Labor	Labor	Labor	"	Tuesday
Chem. Anal.	Chem. Anal.	Chem. Anal.	Chem. Anal.	Chem. Anal.	"	Wednes'y.
Labor	Labor	Labor	Labor	Labor	"	Thursday
	"			"		Friday
JUNIOR ENGINEERS.						
Labor	Labor	Labor	Labor	Labor	Study	Monday
Geom. Draw	Geom. Draw	Geom. Draw.	Geom. Draw.	Geom. Draw.	"	Tuesday
Labor	Labor	Labor.	Labor	Labor	"	Wdenes'y.
Geom. Draw	Geom. Draw	Geom. Draw.	Geom. Draw.	Geom. Draw.	"	Thursday
Labor	Labor	Labor	Labor	Labor	"	Friday
SENIOR CLASS.						
					Study	Monday
Profes	sional	studies	and	lectures ‡	"	Tuesday
					"	Wednes'y.
						Thursday
					"	Friday

‡ In Agriculture—Veterinary Science and Practice, Fruit Culture and Forestry, Meteorology.
In Horticulture—Meteorology, Forestry, Market Gardening.
In Mechanical Engineering—Theory of Motors. Machine Drawing.
In Civil Engineering—Civil Constructions.
In Mining Engineering—Metallurgy, Mine Surveying, and Machinery.
In Architecture—Architectural Designs and Drawing, Carpentry and Masonry.

CALENDAR FOR 1872.

FIRST TERM begins.....March 6th.
NATIONAL ANNIVERSARY.....July 4th.
FIRST TERM EXAMINATIONS.....July 8th, 9th, 10th, 11th.
FIRST TERM closes.....July 11th.

SECOND TERM begins.....July 16th.
COLLEGE ANNIVERSARY.....October 21st.
BACCALAUREATE SERMON.....November 10th.
SECOND TERM EXAMINATIONS....November 11th, 12th, 13th.
SOCIETY EXHIBITIONS.....Monday evening, Nov. 11th.
ADDRESS.....Tuesday evening, Nov. 12th.
COMMENCEMENT EXERCISES.....Wednesday, Nov. 13th.

TERM CLOSES.....November 13th.

MEETINGS OF THE BOARD OF TRUSTEES.

SPRING MEETING.....May 1st.
ANNUAL MEETING.....December 4th.

REPORT OF FARM SUPERINTENDENT.

Abstract of Report for 1870.

Wheat raised 153 bushels; whole cost $77.39; cost per bushel, 50½ cents.

Barley: a small amount sown, which proved nearly a total failure

Oats, 854 bushels; cost, $164.92; cost per bushel, 19¼ cents.

Rye sown, 12½ acres, and seeded to timothy.

Corn raised, 63 acres; bushels harvested, 2030; number of bushels per acre, 32½; total cost, $656.40; cost per bushel, 32 cents.

Hay: total number of tons cut, 34½; cost per ton, $3.89.

Potatoes: total yield, 692 bushels; total cost, $150.49; cost per bushel, 21 5-6 cents.

Mangel-wurzels: Total yield, 1054 bushels; total cost, $97.32; cost per bushel, 9¼ cents.

Carrots: Total yield, 1020 bushels; total cost, $117.27; cost per bushel, 11½ cents.

Turnips; nearly half destroyed by the turnip maggot, the remainder badly injured. Total yield, 274 bushels; total cost $78.16; cost per bushel, 24 9-10 cents.

Farm Improvements.—Built four hundred rods of new board fence, and ninety-eight rods of rail fence, enclosing some seventy acres heretofore lying in common. Built out-pens with old lumber on three sides of hog-house, nine feet wide and sixty-four feet long.

Dug and laid 792 rods of tile drain, at a cost of sixty cents per rod, exclusive of the tile and expense of hauling.

Fifty acres of fall plowing done.

REPORT FOR 1871.

To the Honorable Board of Trustees of the Iowa State Agricultural College and Farm :

I have the honor to submit the following annual report of farm operations, its present condition, future wants, condition and amount of stock, farm implements, etc.

Spring opened early, and seeding commenced by sowing experimental spring wheat, March 22d.

TABLE I.

	Acres in lots.	Bushels sown per lot.	Bushels sown per acre	Yield per lot in bush'ls.	Yield per Acre in bush'ls
Lot No. 1	2	4⅞	2 7-16	18 4-60	9 2-60
Lot No. 2	2	4	2	21 8-60	10 34-60
Lot No. 3	2	3	1½	24 8-60	12 4-60
Lot No. 4	2	2	1	23 20-60	11 40-60
Lot No 5	2	6	3	27 30-60	13 45-60

All of the above was somewhat injured by the "bunt" or smut, induced, perhaps, by the hot sun and heavy dews of June ; the blades were also somewhat rusted.

Lots No. 1 and 2 were more sandy than the rest, and suffered to a greater extent from the early dry weather than the remaining three. Nos. 3, 4, and 5 were, I judge, equal in fertility and quality of soil. Sown broadcast, covered by cultivating once, harrowing twice, and rolling. The ground had been used the year before for carrots and mangels; had been well tended, and was entirely clear from weeds. Variety sown, Italian; harvested July 1st.

Two acres were were prepared last fall for spring wheat, as follows : Lot No. 1, containing one acre, was plowed fourteen inches deep, by running the common plow eight inches deep and then following with the subsoiler. Seed sown, one and one-half bushels;

yield twenty-five bushels. Lot No. 2, containing the same, and same amount of seed, plowed seven inches deep, yielded twenty-three bushels and fifty-six pounds.

In both of the above the variety sown was what is known as the White Michigan. Sown March 23d; harvested July 12th.

Lot No. 3, containing one acre, spring plowed, fourteen inches deep; seed sown, one and one-half bushels; yield, eighteen and two-sixtieth bushels. Lot No. 4, spring plowed, seven inches deep, containing same, and same amount of seed, yielded sixteen bushels. Sown March 26th; harvested July 6th. In both lots, the Italian variety.

All of the above lots had a light coat of manure in the fall of 1870. The crop of that year had been corn, which was cut up and removed.

The following table will show the results :

TABLE II.

No. of Lot.	When prep'rd	How prepared.	Variety.	Sown.	Harvested.	Yield in bushels.
1	Fall...	Subsoiling 14 inches deep ...	White Mich.	Mar. 23.	July 12	25
2	..." ...	rlowing 7 inches deep	....".	...".	...". ...	23 56-60
3	Spring	Subsoiling 14 inches deep	Italian..	Mar. 26	July 6	18 2-60
4	..."...	Plo ving 7 inches deep	....".	...".	...". ...	16

Experiments commenced in the fall of 1870, with winter grain, to test the hardiness of different varieties resulted as follows: Thirty-two quarts Tappahannock turned out seven bushels of fair quality. Too tender, I think, for this climate. Thirty-two quarts French Sanzelle yielded nine bushels—rather poor in quality, being somewhat shrunken. This, also, has the appearance of being tender. Thirty quarts Red Bearded Sisettee, yielded eight bushels; quality good; appears hardy. Three quarts of Polish White (Bearded), yielded fifty-six pounds of rather dark wheat, but good in quality. I think it is not true to name, but would recommend it as being hardy. Sixty-four quarts Lancaster Red, threshed out nineteen and one-half bushels of very plump, nice wheat. This I judge to be hardy.

Eight quarts imported Rye, name not given; total failure. Four quarts Scotch Dun Winter Oats, also a failure. All of the above, except the Lancaster, were received from the Department of Agriculture, at Washington, D. C. The winter grain was sown in standing corn, September 15th, and cultivated in, the corn stalks allowed to stand till the last of April before they were cut down.

Total number of acres of wheat raised, 18.

Total number of bushels raised, 306.

Number of bushels per acre, 17.

Total cost, $153.99; cost per bushel, 51½ cents.

OATS.

Sowed fifteen acres, April 4th and 5th. Ground in fine condition, having been plowed the fall before. Seeded with five varieties, having in view some experiments, but the heavy wind of April 9th so uncovered, and mixed them up that nothing definite could be obtained, and therefore they were cut and threshed together.

Total yield, 786 bushels; yield per acre, 52 2-5 bushels.

Total cost, including labor of sowing grass seed, $134.40; cost per bushel, 16¾ cents.

RYE.

Acres threshed, ten; bushels threshed, two hundred and twenty-three; yield per acre, twenty-two bushels.

Total cost, $141. 05; cost per bushel, 68 cents.

A part of the ground had not been used for growing crops for the last year or two, but had been underdrained in the fall of 1870. The labor of leveling the drains and fitting the ground in a manner suitable for ornamental purposes, (as the field comes within the boundaries designated for that purpose,) with the labor of sowing grass seed, considerably increased the total cost.

CORN.

Early in the month of April we commenced breaking prairie sod, with a twelve-inch plow and one span of mules, aiming to plow at least seven inches deep. Up to May 25th, they had plowed some twenty-eight days, and had forty-two acres completed; this, with the twenty-one acres plowed last fall, was harrowed with a weighted forty-toothed harrow, from three to six times, according to the toughness of the soil; marked out with a sled corn marker, and most of it planted by a Brown corn planter, with two students following to cover any hills which had escaped being covered by the planter. The toughest of the sod the students planted by using spades and axes. About three-fourths of this prairie had been pastured somewhat, the balance was a fair sample of ordinary prairie sod. The yield was but a trifle greater on the pastured over the unpastured sod. The corn was harrowed soon after it was up, with an "A" harrow, and cultivated both ways twice in a space, with a one horse five-toothed cultivator, and finished by running through one way with a two-horse walking cultivator. The ground was very free from weeds and grass, the whole summer. Twelve acres of this sod corn were cut up and removed in time to plow the ground this fall; it is in fine condition and the sod perfectly subdued, and thoroughly rotted. Two rows across the field, north of the College garden, thinned to one stalk in the hill, produced 286 pounds. The adjoining two rows, thinned to two stalks in the hill, produced 462 pounds. The next two were without thinning, and averaged three and one-half stalks to the hill, and produced, 540 pounds. Several other experiments were commenced with a view to ascertaining the relative merits of hand and machine planting, and deep and ordinary plowing. From causes that I could not control, the experiments were rendered somewhat inaccurate, and therefore I deem it best not to report them.

Number acres of corn raised, 115.

Number of bushels, 6959.

Yield per acre, including prairie sod corn, 60½ bushels. (The sod corn was estimated to average fifty bushels to the acre.) Total cost, $1,048.73; cost per bushel, fifteen cents.

The value of breaking sixty-three acres of prairie sod should be taken from the above, which would reduce the cost per bushel to 12 4-5 cents. I should state that the mule team used in plowing the above weighed 2500 lbs., and that the teamster put two hours good faithful work on them each day.

HAY.

The crop was considerably better than last year, and all secured early and in good condition. The small increase in acreage, and better yield per acre, gave an increase over last year of 64 tons. Total number of tons secured, 98½. Total cost, $153.99. Cost per ton, $1.56.

ROOT FIELD.

Two acres of mangel-wurzels were raised; drilled in with hand-drill, thirty-four inches between rows; cultivated twice with five tooth one horse cultivator, and twice with double walking corn plow; hoed out twice, and thinned to about ten inches in the row. Total yield, 1205 bushels. Yield per acre, 601½ bushels.

Two and five-eighths acres of carrots adjoining the mangels, planted in the same way, and tended in the same manner, but the labor of hoeing, plowing, and gathering, was very much greater, as they are very slow to start and much more difficult to raise. Notwithstanding the difficulties, I would always raise enough for a small allowance each day for the horses and colts; but for cattle and sheep, the mangels—in my opinion—would be preferable, on account of their cheapness. The variety raised (Long Orange), is very difficult to dig, and on that account if no other, I would recommend the White Belgian, which has not this objection. Total yield, 890 bushels. Yield per acre, 339.

Total cost of mangels and carrots, $141.93. Average cost per bushel, a little less than 7 cents.

TURNIPS.

In Farm Garden one acre of cabbage was planted in hills, but the seed failed to germinate on account of the extremely hot weather immediately after planting. The ground soon after was re-plowed, and planted to Purple-top Strap-leaf turnips; thinned and hoed out once, and then cultivated three times with one horse cultivator. Total yield, 412 bushels. Yield per acre, 412 bushels. The exact cost per bushel cannot be ascertained, as the labor of planting the cabbage was charged to Farm Garden, with other labor on the same.

POTATOES.

Six acres were planted with five distinct varieties; about one-half of the ground was in potatoes last year, and on this the "bugs" had taken a snap judgment; after battling with them for nearly a month, we retreated in good order. Would have tried Paris green on them, but at that time some of the newspaper correspondents feared that it would poison the tubers.

This idea is now exploded, and Paris green is found to be harmless in that respect, and is undoubtedly the great specific for the potato beetle. The remaining three acres produced a fair crop, yielding 393½ bushels. Total cost, $103.85; cost per bushel, 26⅓ cents.

During the year the following crops have been raised on what is designated as ornamental grounds, most of it situated some little distance from the College: ten acres of rye; fifteen acres of hay; thirty acres of corn; three acres of potatoes; and three acres of fall wheat, now growing. The lawn was mown twice during the summer, furnishing a considerable quantity of good hay, which has been properly credited after deducting the expenses of cutting and securing.

EXPERIMENTAL GROUNDS.

Early in the spring we prepared three acres of ground for experimental purposes, by laying it off in plats of one-eighteenth of an acres each, the object being to test the hardiness and adaptability to this climate of different grains ands grases. (For report on grasses see President's report.) The odd numbered lots were sown to grain, and the even numbers to grass.

No. of Lot.	VARIETY SOWN.	QUALITY OF PRODUCT.	Pounds produced.	YIELD PER ACRE.
1	Fife Spring Wheat	Good	60	18 bushels
3	Excelsior Oats	Good	92	50 6-33 bushels
5	Six-rowed Barley	Good	102	38 12-48 bushels
7	White Marrowfat Peas	Good		
9	White Oats	Good	76	41 15-33 bushels
11	Black Oats	Poor	112	61 3-33 bushels
13	Two-rowed Barley	Good	108	40 24-48 bushels
15	Red Australian Wheat	Fair	56	16 48-60 bushels

No. of Lot.	VARIETY SOWN.	QNALITY OF PRODUCT.	Pounds produced.	YIELD PER ACRE.
17	White Schonen Oats	Good	114	62 6-33 bushels
19	Brewers Delight Barley	Good	92	34 14-48 bushels
21	Thanet Barley	Good	92	34 14-48 bushels
23	White Australian Wheat	Very poor	25	7 30-60 bushels
25	Brewers Delight Barley	Good	94	35 12-48 bushels
27	Amber Australian Wheat	Poor	30	9 bushels
29	Thanet Barley	Good	60	22 24-48 bushels
31	Golden Vine Field Peas	Poor		
33	White Schonen Wheat	Good	84	45 27-33 bushels
35	Excelsior Oats	Good	86	46 30-33 bushels
37	White Australian Wheat	Very poor	20	6 bushels
39	Canada Co. White Wheat	Total failure		

On each of the above plats were sown two quarts of seed, all received from the Department of Agriculture at Washington, D. C. All the grain drilled in with hand drill. No manure used. Corn grown on the ground last year.

FARM STOCK.

At the present time there are on the farm the following :

Cattle—Shorthorns	16	
Devons	3	
Ayrshires	6	
Jerseys	3	
Total of thoroughbreds		28
Grades, half and three-quarter blood	25	
Native milch cows	31	
Fat steers	4	
Total grades and natives		60
Whole number of cattle		88
Swine.—Berkshires	38	
Chester whites	36	
Poland-China	2	
Cross breeds	30	
Total		106

Sheep	115
Horses and Mules	14

The stock is all in healthy condition, and in good order.

For the number and kind of farm implements, see inventory taken December 1st, 1871.

EXPERIMENTS WITH PIGS.

On the morning of September 4th we weighed, and put into pen No. 1, two fair specimens of Native pigs. In pen No. 2, two Berkshires. In pen No. 3, two Chester whites. In pen No. 4, two three-fourth blood Chester, and one-fourth Berkshire. In pen No. 5, two three-fourth blood Chester and one-fourth Suffolk. In pen No. 6, one large hog three-fourth blood Chester and one-fourth Suffolk. The pigs were all nearly of the same age, being about four months old. But two objects were aimed at: the first and greater being to determine the relative values of different breeds; the second to ascertain the price realized for grain when fed under fair circumstances. The pigs chosen were below the average of the different litters from which they were selected. None of them were kept on any thing like a full feed, but fed somewhat better than ordinary store hogs. During the last fifteen days the weather has been extremely cold. Each pen was fed the same quantity of grain. From September 4th to October 19th, each pen consumed seven and one-half bushels of new corn. From October 19th to November 3d, each pen consumed 79 pounds of oats. From November 3, to December 3d, each pen consumed 305 pounds of unbolted corn meal. We are now feeding them on cooked meal, and the next change will be to corn in the ear, as we desire to see what results whole corn will produce in cold weather. As the pigs become older we will put them on full feed, and continue each experiment as may be deemed best, until they arrive at full maturity, which fact will be carefully noted, with all other results attained; all of which will be reported at the proper time.

TABLE III.

SHOWING RESULTS OF EXPERIMENTS IN SWINE FEEDING.

	BREED.	FED ON CORN IN THE EAR.						FED ON OATS SOAKED IN COLD WATER.			FED ON CORN MEAL MOISTENED WITH COLD WATER.				
		Weight Sept. 4.	Weight, Sept. 19.	Weight, Oct. 4th.	Weight Oct. 19.	Gain in pounds.	Price realized for Grain per bushel	Weight Nov. 3.	Gain in pounds.	Price realized for Grain per bushel	Weight Nov. 19.	Weight Dec. 3.	Gain in pounds.	Price realized for grain per bushel	Total gain.	Average Price realized per bushel.
Pen No. 1....	Native.....	48	62	80	98	93	43 cts.	102	20	39¼ cts.	118	124	60	38 4-5 cts.	173	39 3-7 cts
		61	78	86	104			120			140	158				
Pen No. 2....	Berkshire	62	90	104	120	123	57 2-5 cts	130	22	33 1-6 cts	150	158	56	36 cts	201	45 6-7 cts
		82	116	132	148			160			176	188				
Pen No. 3....	Chester White	90	116	132	148	100	46 cts...	162	22	32 1-6 cts	186	184	58	37¼ cts	180	41 cts
		88	104	114	130			138			158	174				
Pen No. 4....	Cross breed—¼ Berkshire, ¾ Chester White....	88	106	124	142	96	44 4-5 cts	158	20	29¼ cts.	182	196	66	42 2-5 cts.	182	41 ⅖ cts.
		96	116	128	138			152			172	180				
Pen No. 5. ...	Cross breed—¼ Suffolk, ¾ Chester White.....	76	102	114	130	102	47 3-5 cts	144	26	39 1-7 cts	170	186	72	46 ¼ cts	200	45 7-11ct
		72	92	108	120			132			154	162				
Pen No. 6.....	One large cross-breed, — ¼ Suffolk, ¾ Chester White	330	362	380	390	60	28 cts...	416	26	39 1-7 cts	452	448	362	30½ cts.	118	26 9-10ct

FARM IMPROVEMENTS.

The wild pasture field situated in the south east corner of the farm containing thirty two acres of creek bottom, we commenced plowing about the first of June; plowed six inches deep. As soon as eleven acres were completed it was harrowed thoroughly, planted to corn June 15th, in drills with plenty of seed—using the planter on about three acres, the balance the students planted with axes; harrowed as soon as up; cultivated twice, and sowed to Rye in the month of August. The frost came before the corn was fully matured; what had not been used up before this time for soiling purposes, was cut up and removed. We put a three horse team into the remainder of the field (21 acres) and finished plowing early in July, and sowed to Rye the last of August. The amount of feed produced from the corn and Rye pasture, was very great. The ground is in fine condition, and if thought best to plow up the Rye in the spring, after pasturing till May 20th, it will make a fine cornfield. During the year we have laid 45 rods of tile drain, built 125 rods of new post and rail fence, and 40 rods of light board fence four and a half feet high. Put in fixtures in wagon house for raising wagon boxes, built board pig-sheds and sheep-house, together with other minor improvements.

NORTH FARM.

Early in the spring Mr. Gilmore was employed to work the farm at a stipulated price for the year. Some twenty acres of oats were sown on the poorest land. The crop was fair, considering the quality of the soil, the yield being 565 bushels of good quality. The same ground was plowed after harvest, the highest land top dressed with fine manure, and sown to rye, which at the present time is looking well. Four quarts of timothy seed to the acre were sown before the last harrowing. Will add two quarts of clover seed to the acre in the spring. Summer fallowed the orchard —some two acres—and sowed to rye and grass early in August. It was pastured to a limited extent during the fall.

The ground planted to corn has never been measured, but it is estimated at forty acres. At the present time sixty-four loads have

been husked, with forty still to husk. The loads will average seventeen bushels, making the total yield 1768 bushels, or a little over 44 bushels to to the acre.

During the year two hundred rods of open ditch have been cut, which already is having a good effect on the wet land.

Seventy panels of new post-and-rail fence have been built, and over two hundred rods of rail fence re-built, and some new rails added to it.

The old wooden-curbed well failing to furnish sufficient water, it was deepened and stoned up. The farm still needs considerable labor to put it in proper shape.

In the cashier's report of the North Farm, the farm has not been credited for the value of the ditching, fencing, and other permanent improvements made during the year, amounting to much more than the "net loss" of $231.54, there given.

PREPARATIONS FOR 1873.

Owing to the large corn crop which had to be gathered, and the early setting in of winter, we have not been able to get much fall plowing done.

Some seven acres of wheat were sown, in addition to the large quantity of rye.

WANTS.

These are necessarily varied and numerous on so large a farm, as yet comparatively new. Among the most pressing is a new barn, with suitable fixtures for cooking food for both cattle and hogs; a large addition to the present accommodations for the hogs is also indispensable.

Some new fence should be built, and quite a number of wet places should be drained.

During the coming year two or three additions should be made to the Shorthorns, to avoid in-breeding.

For these additions and improvements, a sum of not less than seven thousand dollars will be required. Knowing these wants as I do, I beg leave to earnestly recommend that your honorable body take such active measures as shall secure the desired sum.

SUMMARY FOR THE YEAR 1872.

	Number of acres.	Total number of bushels.
Wheat	18	306
Oats	35	1351
Rye	10	223
Corn	155	8725
Potatoes	3	393
Roots	5⅝	2507
Total		13505

Number of tons of hay	108½
Number of acres of fall grain sown	61
Number of pounds of beef furnished	15509
Number of pounds of pork furnished	8700
Number of pounds of butter furnished	3392
Number of quarts of milk furnished	14985

FARM INVENTORY.

Cattle, 88 head	$ 7245 00
Sheep, 115 head	471 00
Horses, 14 head	2000 00
Hogs, 106 head	981 75
Fowls	123 00
Implements	1577 50
Farm house furniture	741 95
Produce on hand	2953 64
Total	$16093 84

Respectfully submitted.

I. P. ROBERTS,
Superintendent.

REPORT OF POMOLOGICAL DEPARTMENT.

To the Board of Trustees of Iowa State Agricultural College:

GENTLEMEN: I have the honor to submit my final report for the current year.

With the exception of September and most of the month of October, during which the weather was very dry, the past season has been quite favorable for vegetation. While last year all plants, vines and trees suffered more or less, and some severely, by drought almost unprecedented, this year, nearly every thing planted or transplanted, has been a success.

At the proper time I set out about three hundred apple trees to supply losses of 1870, and to extend the new orchard, so that it now numbers four hundred in all. These I apprehend, even when they come into good bearing, will not in the supply furnished, be nearly adequate to the wants of our institution. We ought to have trees enough to produce an abundance the year round, not only for the students, but for all the Professors, their families, and others residing upon the farm and in the employ of the State.

According to my estimate, looking forward to the time when the number of students will be largely increased, it would require about twelve hundred trees, including apples, cherries, plums and pears, all of which I think, by selecting and planting suitable kinds, and with proper treatment, can be grown here successfully.

Our vineyard is composed of seven hundred vines, planted eight by seven feet apart. Four hundred were planted in 1870, and the remainder this year. Next year I desire to increase the number to one thousand.

I planted out during the past season twenty-five hundred Doolittle one thousand Davidson's Thornless, two hundred Mammoth Cluster, one hundred Philadelphia, one hundred Golden Cap, fifty Ellisdale and

fifty Canada Black Cap raspberries, making in all four thousand plants.

The Ellisdale is a new variety, and the plants we have, were kindly presented by Mr. H. A. Terry of Crescent City, Iowa, and the Canada Black Cap generously furnished by Mr. Samuel Bower of Cedar Rapids Iowa. These two kinds are quite favorably spoken of by those who have fruited them. The others are all well known and popular varieties.

In the present year's growth the Ellisdale stands first, and the Canada Black Cap next. The Thornless is also a free and healthy grower, and as the name indicates, is quite exempt from thorns, which is a desirable characteristic. I hope to fruit all of the sorts named, next season, and to be able in two or three years, to decide upon the comparative merits of each, for hardiness, productiveness and eating qualities, in this locality.

Strawberry beds have done tolerably well this year, though the latter part of the season has been too dry to produce the general fall growth.

From my experience here thus far, I doubt whether the strawberry, requiring such constant and careful hand-work as it does, will be as profitable as other small fruits. Further trial and observation, will enable me to settle this question. To plant in new soil not yet infested with weeds might to a considerable extent, obviate this difficulty.

I have this fall nearly one thousand grape plants of choice varieties grown from the few cuttings furnished by our young vines last year. From these, with a few plants each of two or three other sorts which I desire to add to our collection, we can fill out the vineyard and have a few hundred to spare, or plant in the nursery for another years growth, as may be thought best.

From seeds procured and planted out last spring, I have about seventy-five thousand apple seedlings, which with a proper proportion of pear, plum, and cherry seedlings superadded, will be sufficient for the commencement of a nursery next year, to be extended from time to time as circumstances may justify.

That the labor of students can be profitably employed in the cultivation of nursery stock, (provided we grow none but model trees

and only the varieties known to be *perfectly hardy*, prolific, and of the qest quality in our soil and climate) I have no doubt.

In connection with this subject, may I suggest for your consideration whether it will not be desirable to have a few acres of experimental grounds, for testing such new kinds of fruits as may be introduced from time to time, and recommended by the leading pomologists of the country; more especially those originated in northern and western localities? Also, whether it is not equally as important that we should test new varieties of fruits on the College Farm, as that we should experiment with new sorts of cereals, grasses, and other agricultural productions?

That *fruit* culture is destined to increase rapidly, and fruits and fruit trees become staple commodities in the productions of Iowa, there is no longer any reason for doubt or speculation. The past few years have settled this problem beyond any reasonable ground for dispute.

That we do to a greater or lesser extent, have to encounter difficulties and vicissitudes not incident to some other portions of the United States, can not be gainsayed; but constant observation and practical experience in Iowa for the last sixteen years and upwards, justify me in the conclusion that the fair average crop, and the superiority of our specimens, more than compensate for the drawbacks resulting from all opposing obstacles combined. I have no doubt that a few years more, will develop our resources in this direction to an extent hardly dreamed of now, by the most sanguine culturists in the State.

I have an ever abiding confidence, that eventhe pear, (that most delicious of all fruits, and as yet produced to so limited an extent,) will ere long be greeted as a common dessert upon our tables.

I sent specimens of a variety of this fruit, (the Doyenne Boussock), last August, to Mr. Charles Downing, of Newburgh, New York, of which in his letter to me acknowledging the receipt of them, he says, "they are the finest specimens of this variety I ever saw," which is certainly a great encomium upon the samples sent, and a high compliment to Iowa, coming from such a source as it does. These were produced on my premises in Knoxville, and were the result of experiments which I have been making in special

manures and other treatment in pear culture, and which will be given to the public when my experimental course shall have been completed. The tree upon which they grew is a dwarf upon the Angers quince; it is now nineteen years old, and has never emitted a root or fiber above the stock upon which it was grafted.

The fruit this year was more than twice as large as that of any previous crop.

By the experience and energy of the young gentlemen students who have worked in my department, I have all the grounds committed to my care, in excellent condition, and the trees, vines, and plants thereon, amply protected for winter. Grape vines are all pruned and covered with earth, and the main stocks of the trees in the new orchard, carefully wrapped with straw, and banked up, so as to protect from mice, rabbits, and winter killing.

The portions of the premises under my special charge at present, are the new orchard, the old nursery, the fruit trees and vines in the farm garden, the small fruit garden embracing raspberries, currants, strawberries &c; the vineyard, flower garden, and the young evergreens.

Your honors are aware, that up to the present time, no appropriation has been made for the fruit department of the College Farm, and that a very shall sum comparatively, has been used for its purposes. The importance of having as soon as possible, a supply of good fruits, on one will dispute; but because of the many necessary expenses attending the successful beginning of an institution so multifarious in its conceptions, plans and operations as this, I have thus far cheerfully yielded to other necessities than those pertaining to pomological purposes, and used the utmost economy in every thing embraced within my jurisdiction.

Like every other interest here however, desired results can not be brought about, if we would insure success, without some outlay at the start. I have made as careful an estimate as I can of what I think will be necessary to place my department not only in successful, but profitable operation, and have fixed the amount at one thousand dollars per annum for the next two years; and am satisfied that this estimate will cover all that will be needed to complete the Orchard, small fruit garden, and flower garden, and to supply the nursery

with all seedlings and other stock needed up to the time when it will be self sustaining, and the proceeds thereof, not only meet all its future demands, but bring an annual income amounting to a handsome per cent per annum over and above all expenses attending its successful cultivation.

The amounts here suggested do not of course embrace cost of builings, such as green-house, tool house &c., which ought to be erected for the preservation of many things pertaining to the nursery, orchard, vineyard, flower garden, vegetable garden &c., and without which great inconvenience and material loss must be the yearly result.

But as these improvements are of a more general character, and should be a part of the permanent fixtures of the Iowa, or any other State Agricultural College Farm, for convenience, utility and economy, I leave that subject for your own consideration and ultimate decision without any special suggestion of mine.

If gentlemen, your honorable board shall concur with me in regard to the appropriations I suggest for the fruit department, I doubt not that ony our recommendation, the Legislature at its session, next winter will make an appropriation of the small sum required for the purpose named.

Respectfully, yours,

JAMES MATHEWS.

DEPARTMENT OF BOTANY AND HORTICULTURE.

Extracts from Report of 1870.

Began work March 11th; made hot-bed, and started early plants. Cleared the ground designed for Garden purposes of rubbish, corn stalks, cane roots, etc. Then manured somewhat over two acres and a-half, putting on the whole about two hundred and twenty-five loads.

As soon as the ground became dry enough it was plowed. This, however, was not well done, being plowed altogether too shallow to withstand the drouth which soon came on. After plowing, the whole was laid out into nine blocks, one hundred and sixty by two hundred and seventy-two and a-fourth feet, separated by drives fifteen feet in width. One acre of this, on the east side, was turned over to Professor Mathews, for small fruits; and it was decided not to break up the south-east half acre of sod, so that in the Garden proper there are seven acres and a-half, exclusive of the space taken up by the drives.

The ordinary Garden crops were planted in their time. All suffered more or less from the excessive drouth of the spring and summer. There were raised in all one hundred and eighty varieties of vegetables, comprising plants of twenty-three different species.

A bed was prepared, and set with the Linnæus variety of Rhubarb. A large percentage of the plants were killed by the drouth. Such as lived are doing well, and will be ready for use next season.

In the fall a bed was begun for Asparagus, by heavily manuring, and then thoroughly plowing and subsoiling. It will be re-manured during the winter, and then subsoiled again in the spring, when it it will be ready for plants.

During the fall two hundred and sixty rods of tile draining were put down under the supervision of the Farm Superintendent, Mr.

Roberts. These drains, though not yet sufficient, will do much to better the land.

At the close of the season the crops were removed, (excepting parsnips and salsify,) and the ground manured, and then carefully plowed and subsoiled, and left in the rough for winter.

REPORT FOR 1871.

To the Board of Trustees of the Iowa Agricultural College:

GENTLEMEN: I herewith submit my annual report of the Department of Botany and Horticulture for the year 1871 :

For both out-door and class-room work the year just closed has been pleasant as well as profitable. In the class-room the students under my charge have manifested a gratifying degree of interest in the study of Botany; and for the out-door operations I can say that as a general thing those working with me have done so with cheerfulness, taking a good degree of interest in their work, and performing their tasks in a satisfactory manner. In the results obtained the year has also been eminently successful. Most of the crops have done well, though the short periods of drouth in the summer, and the dry weather of the fall, somewhat decreased certain crops. The whole work has moved on with a uniformity not known last year, and all of the improvements begun have been successfully carried out.

PERMANENT IMPROVEMENTS.

Finished the drives on the north side of the garden, and made considerable improvement upon those already in use. These drives are now in quite good condition, but on account of their not being graveled, it will take a good deal of work annually to keep them in good repair, and free from weeds. Some labor was put upon a portion of the ground in preparing it for better cultivation next year, by not planting it, keeping it free from weeds, and constantly stirring it with the plow and cultivator. This portion now promises to fully

repay all the labor expended upon it, in the looser condition of the soil, and its greater freedom from weeds. As a whole the ground is now in much better condition for garden purposes than a year ago. The effect of the somewhat extensive system of under-drains laid last season, is beginning to show itself in the greater friability of the soil, which before draining was so tenacious as to make it exceedingly difficult to plow.

CROPS RAISED.

Although the main object of the garden is to serve as a means of illustration, we have raised upon it more than enough to supply the wants of the boarding-hall, farm house, and Professors' families. The following list embraces the more important crops raised for this purpose :

Beans,	Lettuce,	Radishes,
Beets,	Melons,	Salsify,
Cabbages,	Onions,	Squashes,
Carrots,	Parsnips,	Turnips,
Corn,	Peas,	Tomatoes.
Cucumber,	Potatoes.	

In the spring I procured and set out in the bed prepared last year, one thousand roots of Purple Giant Asparagus, also planted one hundred roots of Conover's Colossal. Both varieties did so well that I expect to crop quite heavily next spring. The Rhubarb bed made last year yielded a full supply for the boarding hall. Such plants as died out from the drouth of last year were very generously replaced by the firm of Mathews & Son, of Knoxville. Also prepared and set out a bed of Horseradish, which did well.

EXPERIMENTS.

Seventy-nine varieties of potatoes were planted with a view to determining which were least liable to suffer from the attacks of the potato beetle. The following is the list of those tried :

Black Mercer.	EARLY ROSE.
Great Western.	Early White Sprout.
Early York.	Shaker's Fancy.

Early Pinkeye.
Chenango.
Patterson's Blue.
Calico.
White Mountain.
Union.
White Rock.
Kearsearge.
Extra Early White.
Early Wendall,
Rough & Ready.
Early London.
Irish Cup.
Gleason.
Scotch Blue.
Chenery.
Colbrook Seedling.
Cuzco.
Russet No. 1.
Snowball.
Late Pinkeye.
Shaker Russet.
Shaker Russet No. 2.
British Queen.
Mountain Sprout.
Lapstone Kidney.
Early Don.
Mercer.
Coppermine.
Seedling Rock.
Early Stevens.
Early Sovereign.
Dover Seedling.
Prince of Wales.
Noblow.
Napoleon.
Dykeman.
Climax.
Harrison.
Early Shaw.
Early Mohawk.
Excelsior.
King of the Earlies (No. 4).
Bresee's Prolific (No. 2).
Peerless (No. 6).
Garnet Chili.
Chili No. 2.
White Chili.
PEACHBLOW.
WHITE-EYED PEACHBLOW.
WHITE PEACHBLOW.
White Apple.
Vanderveer's Seedling.
Six Weeks.
Jackson White.
Merino.
Ohio Russet.
Prince Albert.
Black Kidney.
Pennsylvania Searchwarrant.
Andes.
Orono.
Strawberry.
Sebec.
Scotch Russet.
Early Buckeye.
Callao.
Early Goodrich.
Lady Finger.
Western Red.
Farfarshire Red.
Early Handsworth.
Bulkley's Seedling.

Those in Italics were entirely destroyed by the beetle; while the Peachblow and Chili varieties stood their attacks without suffering much. Climax also showed a good deal of freedom from injury in this respect. For an early potato, Early Rose suffered as little as any in the whole lot, while the much vaunted King of the Earlies was almost annihilated. We never need expect to find a beetle-proof variety of potato, but by planting those most nearly so, we shall at any rate prevent the beetles increasing as rapidly as they would otherwise have done. All things considered, the Early Rose is perhaps the best early potato for general culture; while the Peachblows will generally prove the most satisfactory for late plantings.

White Apple is, to all appearance but a sub-variety of the Peachblows, so that I have classed it with them.

TOMATOES.

About thirty varieties of tomatoes were tried, the most important of which are the following:

Extra Early Red.—Early and very prolific, but badly curved, and wrinkled.

Trophy.—Large, heavy, smooth, and reasonably early. Worthy of general introduction.

General Grant.—Good.

Tilden's New.—Very good.

Fejee.—Large and heavy, but too late.

Yellow Fig, *Yellow Cherry*, and *Red Cherry.*—Small and smooth; valuable for preserving.

CABBAGE.

Planted about twenty varieties, native and foreign.

Early York and *Early Wakefield* for early varieties, *Winnigstadt* for second early, and *Marblehead Mammoth* and *Stone Mason* for late use, are worthy of general cultivation. Among the recently introduced foreign varieties, *McEwan's Early* seems worthy of further attention.

BEETS.

Of the fourteen varieties planted, none seemed better for table use

than the *Philadelphia Early Turnip Beet*, which is medium sized, round, smooth, and of a fine dark red color.

Bassano, and *Early Blood Turnip* are too well known to need recommendation here.

CORN.

Tried several varieties of sweet corn, which were sent out by the Department of Agriculture at Washington, D. C.

Asylum Sweet, resembles somewhat the old standard sort, *Stowell's Evergreen*, but its ears are larger and fewer rowed.

Narragansett Sweet is perhaps worthy of some attention. It is of a low and slender habit, producing its small but exceedingly sweet ears very early in the season. Where earliness is important this will probably be a very desirable variety.

INSECTS.

As Iowa has no State Entomologist, it may not be out of place to name a few of the worst insects found on the garden.

On Beans. Last season (1870) during the excessive drouth, beans were attacked by the red spider (*Trombidium telarium*, Herm,) which caused the crop to prove almost an entire failure. This pest is a little mite, not more than one fiftieth of an inch in length, living on the under surface of the leaves. Fortunately its habits prevent its becoming injurious in seasons when there is much rain, as it can not stand the wet. Remedy: copious watering with cold water.

On Cabbage. The little black flea-beetle (*Haltica striolata*, Illiger,) is often destructive to young cabbages, turnips and allied plants. Ashes sprinkled on the plants when moist, will help the matter.

Cut worms (*Agrotis*—perhaps several species,) did some damage the past season. In order to get rid of these, every particle of rubbish should be taken off of the ground in the fall, and the whole then plowed so as to expose it to all the freezing and thawing possible.

The Cabbage Moth (*Plutella cruciferarum*, Zeller,) was very destructive here in 1870, and did some damage this year. The larvæ of this moth is a little green worm about half an inch in length; it lives on the under side of the leaves, and eats multitudes of holes into them. I know of no remedy.

The larger cabbage worm, which is the larvæ of the common white butterfly, (*Pieris Protodice*, Boisd) is about one inch in length, greenish, marked with longitudinal yellow stripes. This season it was found in some abundance in the garden, boring into the heads of cabbage; and when it was allowed to have its own way it utterly destroyed the head. Hand picking the "worms" will do much to prevent their ravages. The butterflies can also be easily caught in hand-nets and killed, as they are not rapid in flight.

The cabbage plant louse (*Aphis brassicæ*, L.,) was very abundant during the past season, and proved quite injurious to cabbage, cauliflower, kale &c. I know of no effectual remedy.

On Corn. This season a neighbor called my attention to a worm which was boring into his corn. Upon examination I found it to be the corn worm (*Heliothis armigera*, Hubner,) which seems to be advancing upon us from the south, where it feeds upon the cotton bolls, and is accordingly called the Boll Worm.

The perfect insect is a night flying moth, with a spread of wing of an inch and a half or more, while the worm or larva is in size and appearance very much like a fat cut-worm. Hand picking, though laborious, seems to be the most effectual remedy yet discovered.

On Cucumber, Squash, &c.—The two worst enemies of these plants, during the last two years, were the twelve spotted cucumber beetle, (*Diabrotica 12-punctata*, Fabr.) and the striped squash beetle, (*Diabrotica vittata*, Fabr.) both of which are yellow above, with black markings, the former with twelve black dots on the back, the latter with three longitudinal black lines. A mixture of one part of Paris green to ten or twelve of flour, proved a very efficient remedy this season.

On Potatoes.—Tho Colorado potato beetle (*Doryphora decemlineata*, Say.)seems to be slowly giving way before its numerous enemies. For a considerable time last spring the "Lady Bugs," (*Coccinella* and *Hippodamia*) ate up the eggs of the beetle as fast as laid, and I am certain that on the garden, at least, these friends of ours reduced the crop of beetles fully one-half. I was gratified at finding another active enemy of the beetle, the Soldier Bug, busily at work during the summer, killing the young larvæ.

Entomologists now count up about a dozen quite important insects engaged in this good work of exterminating the potato beetle, so that we may with considerable certainty predict that we have passed the worst, and that the future, with of course some fluctuations, will show an annual decrease in the amount of injury done the potato crop by this pest.

Aside from these natural checks, hand picking and the application of Paris green, are the most universally adopted means for their eradication. Of the two, the former is perhaps the best, all things considered.

A judicious selection of such varieties of potatoes as suffer least from their attacks, will also do much to shorten the stay of the beetle among us.

PREPARATIONS FOR NEXT YEAR.

At the close of the season the debris of crops was cleared off, such vegetables as were designed for use next spring were buried, and the ground plowed in part. The early setting in of cold weather prevented the completion of this work.

A quantity of peat was dug from the bed on the farm, and piled up for use in making compost during the winter and spring. By utilizing the material on hand, I do not see why we cannot manufacture from five hundred to a thousand loads of first-class fertilizer each year, which would be fully enough to meet all the demands of the garden.

NEEDS.

The most pressing want just now is for a Garden-house. This should contain an office, seed-room, tool-room, and vegetable-room, and under the whole their should be a good sized frost-proof cellar. As the fruit department also needs a cellar, and grafting room, a considerable expense might be saved by combining all into one larger building.

The supply of tools is not sufficient for all purposes. We should have a greater variety as well as a greater number, so that our students can become acquainted with the use of all kinds of garden implements.

I would also call your attention to the fact that we need a greenhouse and conservatory, for the propagation and preservation of flowering plants.

I have placed these needs in the order of their importance, and would respectfully urge that efforts be made for providing, at least the Garden-house before mentioned.

BOTANY.

The Sophomore and Junior classes pursued this subject as laid down in the course of study, both classes doing their work in a thorough and satisfactory manner. In the first mentioned class collections of plants were made amounting in the aggregate to upwards of two thousand specimens; these were neatly mounted in suitable books, correctly named, and preserved for further study next year.

During the past two years I have been endeavoring to make a full collection of the plants of this locality, but for want of time have not yet been able to do so. This season we added quite materially to the Herbarium both by exchange and purchase, and now have representatives of perhaps about twenty-five hundred species. There should be some provision made for an annual addition of at least a thousand species, which would in a few years give us a good sized and valuable collection.

I append below, a list of plants, as a contribution to the Flora of Iowa. The list is necessarily imperfect, in omitting many plants known to be native of Iowa, but which for lack of time to fully identify have been left out. In collecting the material for the list I have been greatly aided by Mr. J. C. Arthur, of the Junior class, and am under many obligations to Professor Carpenter, of Indianola, Professor McLain, of Fayette, and Professor Parker, late of Grinnell, (now of Amherst, Mass.,) for lists of plants found in their respective localities.

Rev. Isaiah Reid, of Nevada, also furnished me with a partial list of the plants collected by him several years ago in the vicinity of Burlington.

All of which is respectfully submitted.

CHAS. E. BESSEY.

CONTRIBUTIONS TO THE FLORA OF IOWA.

(Plants in *italic* are introduced, and in most cases are weeds.)

RANUNCULACEÆ.

Leather Flower. Clematis Viorna, L.
Des Moines; Ames.

Virgin's Bower. Clematis Virginiana, L.
Charles City; Ames; Fayette; Burlington.

Pasque Flower. Anemone patens, L. var. Nuttalliana.
Charles City: Fayette.

Carolina Anemone. Anemone Caroliniana, Walt.
Ames.

Many Cleft Anemone. Anemone multifida, DC.
Burlington—rare.

Long Fruited Anemone. Anemone cylindrica, Gray.
Charles City; Ames.

Pennsylvanian Anemone. Anemone Pennsylvanica, L.
Grinnell; Ames; Fayette.

Wind Flower. Anemone nemorosa, L.
Charles City; Ames; Fayette; Burlington.

Round Lobed Hepatica. Hepatica triloba, Chaix.
Fayette; Burlington.

Sharp Lobed Heptica. Hepatica acutiloba, DC.
Charles City; Ames; Fayette.

Rue Anemone. Thalictrum anemonoides, Michx.
Ames; Fayette.

Early Meadow Rue. Thalictrum dioicum, L.
Ames; Fayette.

Purplish Meadow Rue. Thalictrum purpurascens, L.
Ames.

Fall Meadow Rue. Thalictrum Cornuti, L.
Ames; Grinnell; Charles City; Fayette.

White Water Crowfoot. Ranunculus aquatilis, L. var. trichophyllus.
Hamilton county.

Yellow Water Crowfoot. Ranunculus multifidus, Pursh.
Ames; Indianola.

Sea-Side Crowfoot. Ranunculus Cymbalaria, Pursh.
Ames—rare.

Ranunculus rhomboideus, Goldie.
Charles City; Fayette.

Small Flowered Crowfoot. Ranunculus abortivus, L.
Grinnell; Indianola; Fayette.

Cursed Crowfoot. Ranunculus sceleratus, L.
Ames.

Bristly Crowfoot. Ranunculus Pennsylvanicus, L.
Burlington.

Early Crowfoot. Ranunculus fascicularis, Muhl.
Indianola; Fayette; Burlington.

Creeping Crowfoot. Ranunculus repens, L.
Grinnell; Indianola; Ames.

Buttercups. Ranunculus *bulbosus*, L.
Indianola.

Isopyrum biternatum, Torr. & Gray.
Ames—very common.

Marsh Marigold. Caltha palustris, L.
Ames; Grinnell; Charles City; Fayette.

Wild Columbine. Aquilegia Canadensis, L.
Ames; Grinnell; Charles City; Fayette; Burlington.

Tall Larkspur. Delphinium exaltatum, Ait.
Grinnell

Dwarf Larkspur. Delphinium tricorne, Michx.
Indianola.

Azure Larkspur. Delphinium azureum, Michx.
Ames; Charles City.

White Baneberry. Actæa alba, Bigel.
Ames; Charles City.

ANONACEÆ.

Papaw. Asimina triloba, Dunal.
Marion County; Burlington.

MENISPERMACEÆ.

Canadian Moonseed. Menispermum Canadense, L.
Ames; Fayette,

BERBERIDACEÆ.

Blue Cohosh. Caulophyllum thalictroides, Michx.
Ames; Fayette; Burlington.

May Apple. Podophyllum peltatum, L.
Ames; Grinnell; Indianola; Charles City; Fayette; Burlington.

NYMPHÆACEÆ.

Yellow Nelumbo. Nelumbium luteum, Willd.
Burlington.

White Water Lily. Nymphæa odorata, Ait.
Ames; Charles City; Fayette.

Yellow Pond Lily. Nuphar advena, Ait.
Ames; Charles City.

Small Yellow Pond Lily. Nuphar luteum, Smith. var. pumilum. (N. Kalmiana, Pursh.)
Fayette.

PAPAVERACEÆ.

Common Poppy. Papaver *somniferum*, L.
Escaped as a weed at Charles City.

Smooth Fruited Corn Poppy. Papaver *dubium*, L.
Escaped as a weed at Charles City.

Blood Root. Sanguinaria Canadensis, L.
Ames; Grinnell; Charles City; Fayette; Burlington

FUMARIACEÆ.

Dutchman's Breeches. Dicentra Cucullaria, DC.
Ames; Grinnell; Fayette; Burlington.

CRUCIFERÆ.

Two-leaved Pepper Root. Dentaria diphylla, L.
Burlington.

Pepper-root. Dentaria laciniata, Muhl.
Ames; Grinnell; Burlington.

Spring Cress. Cardamine rhomboidea, DC.
Ames; Charles City; Grinnell; Fayette.

Rock Cress. Arabis dentata, Torr. & Gray.
Fayette.

Wood Cress. Arabis hesperidoides, Gray.
Ames.

Worm-seed Mustard. Erysimum cheiranthoides, L.
Ames.

Hedge Mustard. Sisymbrium *officinale*, Scop.
Ames; Fayette.

Charlock. Brassica *Sinapistrum*, Boissier. (Sinapis arvensis. L.)
Ames.

Black Mustard. Brassica *nigra*, L.
Ames; Charles City; Fayette. A vile weed, coming into fields from the East.

Draba Caroliniana, Walt.
Ames.

False Flax. Camelina *sativa*, Crantz.
Ames; Grinnell.

Shepherd's Purse. Capsella *Bursa-pastoris*, Mœnch.
Ames; Indianola; Charles City; Fayette; Burlington. A weed, common in fields and neglected grounds, as are also the two following.

Wild Pepper-grass. Lepidium Virginicum, L.
Ames; Grinnell; Fayette; Burlington.

Pepper-grass. Lepidium *ruderale*, L.
Ames.

Radish. Raphanus *sativus*, L.
cultivation in places.

CAPPARIDACEÆ.

Polanisia graveolens, Raf.
Ames.

VIOLACEÆ.

Round-leaved Violet. Viola rotundifolia, Michx.
Fayette; Grinnell.

Common Blue Violet. — Viola cucullata, Ait.
Grinnell; Ames; Charles City; Indianola; Burlington.

Var palmata.
Found at Fayette and Burlington.

Arrow-leaved Violet. — Viola sagittata, Ait.
Fayette.

Larkspur Violet. — Viola delphinifolia, Nutt.
Ames; Grinnell; Indianola; Fayette; Burlington.

Bird-foot Violet. — Viola pedata, L.
Ames; Grinnell; Charles City; Fayette; Burlington.

Downy Yellow Violet. — Viola pubescens, Ait.
Ames; Grinnell; Charles City; Burlington.

Viola *tricolor*, L. var. *arvensis*.
Ames.

HYPERICACEÆ.

Great Saint John's-wort. — Hypericum pyramidatum, Ait.
Ames, rare.

Hypericum Kalmianum, L.
Burlington, rare.

Common Saint John's-wort. — Hypericum *perforatum*, L.
Burlington. *A pernicious weed.*

CARYOPHYLLACEÆ.

Bouncing Bet. — Saponaria *officinalis*, L.
Des Moines; Charles City.

Cow Herb. — Vaccaria *vulgaris*, Host.
Grinnell.

Starry Campion. — Silene stellata, Ait.
Ames; Grinnell; Burlington.

Sleepy Catchfly. — Silene antirrhina, L.
Ames.

Corn-Cockle. — Lychnis *Githago*, Lam.
Ames; Charles City; Fayette. Found too often in wheat fields.

Sandwort. — Arenaria lateriflora, L.
Grinnell; Fayette.

Mouse-ear Chickweed. — Cerastium *vulgatum*, L.
Fayette; Burlington.

Larger Mouse-ear Chickweed. — Cerastium *viscosum*, L.
Ames; Burlington.

Cerastium nutans, Raf.
Indianola.

Corn Spurry. — Spergula *arvensis*, L.
Ames.

Carpet-weed. — Mollugo verticillata, L.
Cedar Rapids.

PORTULACACEÆ.

Purslane. — Portulaca *oleracea*, L.
Common as a weed in gardens and fields.

Portulaca. — Portulaca *grandiflora*, ——,
Escaping as a weed at Charles City.

Spring Beauty. — Claytonia Virginica, L.
Ames; Charles City; Indianola; Grinnell; Fayette; Burlington.

Spring Beauty. — Claytonia Caroliniana, Michx.
Grinnell.

MALVACEÆ.

Common Mallow. — Malva *rotundifolia*, L.
Ames; Des Moines; Cedar Rapids.

High Mallow. — Malva *sylvestris*, L.
Ames.

Indian Mallow. — Abutilon *Avicennæ*, Gærtn.
Ames; Indianola; Fayette; Marshalltown; Burlington; &c.
An Indian plant coming to us as a troublesome weed.

Bladder Ketmia. — Hibiscus *Trionum*, L.
Escaping as a weed at Indianola.

TILIACEÆ.

Basswood. — Tilia Americana, L.
Ames; Charles City; Fayette; Burlington.

LINACEÆ.

Wild Flax. — Linum sulcatum, Riddell. (L. Boottii, Planchon.)
Ames; Charles City; Burlington.

Common Flax. Linum *usitatissimum*, L.
Escaping from cultivation at Ames.

GERANIACEÆ.

Wild Cranesbill. Geranium maculatum, L.
Ames; Charles City; Grinnell; Fayette.

Pale Touch-me-not. Impatiens pallida, Nutt.
Grinnell.

Spotted Touch-me-not. Impatiens fulva, Nutt.
Ames; Fayette; Burlington.

Violet Wood-Sorrel. Oxalis violacea, L.
Ames; Charles City; Indianola; Grinnell; Fayette; Burlington.

Yellow Wood-Sorrel. Oxalis stricta, L.
Ames; Charles City; Indianola; Grinnell; Fayette; Burlington.

RUTACEÆ.

Prickly Ash. Zanthoxylum Americanum, Mill.
Ames; Charles City; Fayette.

ANACARDIACEÆ.

Smooth Sumach. Rhus glabra, L.
Ames; Charles City; Fayette; Burlington.

Poison Ivy. Rhus Toxicodendron, L.
Ames; Charles City; Fayette; Burlington.

VITACEÆ.

Summer Grape. Vitis æstivalis, Michx.
Burlington.

Frost Grape. Vitis cordifolia, Michx.
Ames; Fayette; Burlington.

Virginia Creeper. Ampelopsis quinquefolia, Michx.
Ames; Charles City; Fayette; Burlington. This beautiful vine is often mistaken for its poisonous relative, the Poison Ivy. This creeper has *five* leaflets, while the Poison Ivy has but *three*.

RHAMNACEÆ.

New Jersey Tea. Ceanothus Americanus, L.
Ames; Charles City; Grinnell; Burlington.

Ceanothus ovalis, Bigelow.
Ames; Fayette.

CELASTRACEÆ.

Climbing Bitter-Sweet. Celastrus scandens, L.
Ames; Fayette; Burlington.

Waahoo. Euonymus atropurpureus, Jacq.
Ames; Fayette; Burlington.

SAPINDACEÆ.

Bladder Nut. Staphylea trifolia, L.
Ames; Charles City; Fayette; Burlington.

Ohio Buckeye. Æsculus glabra, Willd.
Indianola.

Sweet Buckeye. Æsculus flava, Ait.
Burlington.

Sugar Maple. Acer saccharinum, Wang.
Ames; Charles City; Fayette; Burlington.

Var. nigrum.
Fayette.

Silver Maple. Acer dasycarpum, Ehrhart.
Ames; Fayette; Burlington.

Box Elder. Negundo aceroides, Moench.
Ames; Grinnell; Fayette; Burlington.

POLYGALACEÆ.

Milkwort. Polygala incarnata, L.
Ames; Grinnell.

Polygala sanguinea, L.
Ames; Charles City.

Polygala verticillata, L.
Ames; Charles City.

Seneca Snakeroot. Polygala Senega, L.
Burlington.

LEGUMINOSÆ.

Stone Clover. Trifolium *arvense*, L.
Lately introduced at Ames.

Red Clover. Trifolium *pratense*, L.
Cultivated largely.

White Clover. Trifolium repens, L.
Introduced in cultivation.

Low Hop-Clover. Trifolium *procumbens*, L.
Lately introduced at Ames.

White Meliot. Melilotus *alba*, Lam.
Charles City; Cedar Rapids.

Black Medick. Medicago *lupulina*, L.
Lately introduced at Ames.

Psoralea argophylla, Pursh.
Grinnell.

Violet Prairie Clover. Petalostemon violaceus, Michx.
Ames; Charles City; Grinnell.

White Prairie Clover. Petalostemon candidus, Michx.
Ames; Charles City; Grinnell.

False Indigo. Amorpha fruticosa, L.
Ames; Indianola; Grinnell; Burlington.

Lead Plant. Amorpha canescens, Nutt.
Ames; Charles City; Indianola; Grinnell; Burlington.

Common Locust. Robinia Pseudacacia, L.
Largely planted, especially in the southern counties. Frequently called, also, Black Locust.

Ground Plum. Astragalus caryocarpus, Ker.
Ames; Charles City; Grinnell; Fayette.

Astragalus Canadensis, L.
Ames; Charles City; Burlington.

Astragalus distortus, Torr. & Gr.
Burlington.

Tick Trefoil. Desmodium acuminatum, DC.
Ames; Burlington.

Desmodium cuspidatum, Torr. & Gr.
Burlington.

Desmodium paniculatum, DC.
Grinnell.

Desmodium Canadense, DC.
Ames; Grinnell; Indianola.

Desmodium sessilifolium, Torr. & Gray.
Ames.

Bush Clover. Lespedeza capitata, Michx.
Grinnell.

Vetch. Vicia Americana, Muhl.
Ames; Charles City; Fayette.

Vetchling. Lathyrus venosus, Muhl.
Fayette.

Marsh Vetchling. Lathyrus palustris, L.
Ames.

Ground-nut. Apios tuberosa, Mœnch.
Ames; Grinnell.

Wild Bean. Phaseolus perennis, Walt.
Ames; Charles City; Burlington.

Phaseolus diversifolius, Pers.
Ames, along the Des Moines River.

False Indigo. Baptisia leucantha, Torr. & Gr.
Ames; Charles City; Grinnell; Burlington.

Baptisia leucophæa, Nutt.
Ames; Charles City; Indianola; Grinnell; Fayette; Burlington.

Red Bud. Cercis Canadensis, L.
Burlington.

Partridge Pea. Cassia Chamæcrista, L.
Ames; Grinnell; Charles City; Burlington.

Kentucky Coffee-tree. Gymnocladus Canadensis, Lam.
Ames; Burlington.

Honey Locust. Gleditschia triacanthos, L.
Ames, common variety with thorns, and also a thornless variety; Burlington.

ROSACEÆ.

Wild Plum. Prunus Americana, Marsh.
Ames; Indianola; Grinnell; Fayette; Charles City; Burlington.

Chickasaw Plum. Prunus Chicasa, Michx.
Fayette.

Wild Red Cherry. Prunus Pennsylvanica, L.
Ames; Charles City; Fayette.

Choke Cherry. Prunus Virginiana, L.
Ames ; Charles City ; Fayette ; Burlington.

Wild Black Cherry. Prunus serotina, Ehrhart.
Ames ; Grinnell ; Fayette ; Burlington.

Nine-Bark. Spiræa opulifolia, L.
Charles City.

Meadow-Sweet. Spiræa salicifolia, L.
Charles City.

Agrimony. Agrimonia Eupatoria, L.
Ames ; Charles City.

Avens. Geum album, Gmelin.
Ames.

Geum triflorum, Pursh.
Charles City ; Fayette.

Norway Cinque-foil. Potentilla Norvegica, L.
Ames.

Common Cinque-foil Potentilla Canadensis, L.
Ames ; Charles City ; Fayette ; Burlington.

Potentilla arguta, Pursh.
Ames ; Grinnell ; Charles City.

Wild Strawberry. Fragaria Virginiana, Ehrhart. (var. Illinoensis.)
Ames.

Wild Red Raspberry Rubus strigosus, Michx.
Ames ; Charles City ; Fayette.

Wild Black Raspberry. Rubus occidentalis, L.
Ames ; Charles City ; Fayette ; Burlington.

Wild Blackberry. Rubus villosus, Ait.
Ames ; Charles City ; Fayette ; Burlington.

Wild Rose. Rosa lucida, Ehrhart.
Ames ; Burlington.

Wild Rose. Rosa blanda, Ait.
Ames ; Fayette. These two species of Rosa seem to be too nearly alike.

Black Thorn. Cratægus tomentosa, L.
Ames ; Indianola ; Fayette.

Var. punctata, Gray.
Ames. Other forms are found in abundance, but they seem to be not sufficiently fixed, for classifying.

Cockspur Thorn. Cratægus Crus-Galli, L. (?)
Burlington.

American Crab-Apple. Pyrus coronaria, L.
Ames ; Grinnell ; Charles City ; Fayette ; Burlington.

Service Berry. Amelanchier Canadensis, Torr. & Gr.
Ames ; Indianola ; Fayette ; Burlingto

SAXIFRAGACEÆ.

Wild Gooseberry. Ribes hirtellum, Michx.
Burlington.

Wild Gooseberry. Ribes rotundifolium, Michx.
Ames ; Fayette.

Wild Black Currant. Ribes floridum, L.
Ames ; Fayette ; Burlington.

Wild Hydrangea. Hydrangea arborescens, L.
Fayette.

Grass of Parnassus. Parnassia Caroliniana, Michx.
Ames.

Swamp Saxifrage. Saxifraga Pennsylvanica, L.
Grinnell ; Burlington.

Alum Root. Heuchera hispida, Pursh.
Ames; Grinnell ; Charles City ; Fayc

CRASSULACEÆ.

Ditch Stone-crop. Penthorum sedoides, L.
Ames ; Charles City.

HALORAGEÆ.

Mermaid Weed. Proserpinaca palustris, L.
Ames.

ONAGRACEÆ.

Enchanter's Nightshade. Circæa Lutetiana, L.
Ames ; Burlington.

Gaura. Gaura biennis, L.
Des Moines ; Indianola.

Willow Herb. Epilobium coloratum, Muhl.
Ames ; Charles City.

Evening Primrose. Œnothera biennis, L.
Ames ; Indianola ; Burlington.

Œnothera serrulata, Nutt.
Ames ; Charles City.

Ludwigia polycarpa, Short & Peter.
Ames.

LYTHRACEÆ.

Loosestrife. Lythrum alatum, Pursh.
Ames ; Grinnell ; Charles City.

CUCURBITACEÆ.

One-seeded Cucumber. Sicyos angulatus, L.
Ames, on Des Moines river.

Wild Balsam Apple. Echinocystis lobata, Torr. & Gray.
Ames ; Charles City.

UMBELLIFERÆ.

Black Snakeroot. Sanicula Marilandica, L.
Ames.

Button Snakeroot. Eryngium yuccæfolium, Michx.
Ames ; Grinnell ; Charles City.

Cow Parsnip. Heracleum lanatum, Michx.
Ames ; Grinnell ; Fayette.

Common Parsnip. Pastinaca *sativa*, L.
Escaping from cultivation at Ames.

Cow bane. Archemora rigida, DC.
Ames ; Charles City. Plant poisonous.

Great Angelica. Archangelica atropurpurea, Hoffm.
Ames ; Charles City.

Meadow Parsnip. Thaspium aureum, Nutt.
Ames ; Grinnell ; Charles City.

Zizia integerrima, DC.
Ames ; Burlington.

Honewort. Cryptotænia Canadensis, DC.
Ames.

Chervil. Chærophyllum procumbens, Lam.
Ames.

Smoother Sweet Cicely. Osmorrhiza longistylis, DC.
Ames.

Hairy Sweet Cicely. Osmorrhiza brevistylis, DC.
Ames.

ARALIACEÆ.

Spikenard. Aralia racemosa, L.
Ames ; Fayette ; Burlington.

Wild Sarsaparilla. Aralia nudicaulis, L.
Ames ; Burlington.

Ginseng. Aralia quinquefolia, Gray.
Fayette ; Burlington.

CORNACEÆ.

Round Leaved Cornel. Cornus circinata, L'Her.
Ames.

Kinnikinnik. Cornus sericea, L.
Ames.

Red-Osier Dogwood. Cornus stolonifera, Michx.
Burlington.

Rough Leaved Dogwood. Cornus asperifolia, Michx.
Fayette.

Panicled Cornel. Cornus paniculata, L'Her.
Ames ; Charles City ; Burlington.

Alternate Leaved Cornel. Cornus alternifolia, L.
Fayette ; Burlington.

CAPRIFOLIACEÆ.

Wolfberry. Symphoricarpus occidentalis, R. Br.
Charles City.

Small Honey suckle. Lonicera parviflora, Lam. var. Douglasii.
Ames ; Charles City ; Fayette.

Horse Gentian. Triosteum perfoliatum, L.
Ames ; Grinnell ; Charles City ; Fayette ; Burlington.

Black Elder. Sambucus Canadensis, L.
Ames ; Charles City ; Burlington.

Red Elder. Sambucus pubens, Michx.
Ames.

Sheep-Berry. Viburnum Lentago, L.
Ames ; Grinnell ; Burlington.

Withe-rod. Viburnum nudum, L.
Fayette.

Downy Arrow-wood Viburnum pubescens, Pursh.
Ames.

Cranberry Tree. Viburnum Opulus, L.
This, or a nearly allied species, is found at Charles City.

RUBIACEÆ.

Bedstraw. Galium concinnum, Torr. & Gr.
Burlington.

Small Bedstraw. Galium trifidum, L.
Ames ; Grinnell ; Charles City.

Button Bush. Cephalanthus occidentalis, L.
Ames ; Burlington.

COMPOSITÆ.

Iron-Weed. Vernonia fasciculata, Michx.
Ames ; Grinnell ; Charles City ; Burlington. This, on low pasture lands, is a somewhat troublesome weed.

Blazing Star. Liatris cylindracea, Michx.
Ames ; Grinnell.

Liatris scariosa, Willd.
Ames ; Indianola ; Grinnell ; Charles City ; Burlington.

Liatris pychnostachya, Michx.
Ames ; Indianola ; Grinnell ; Charles City.

Kuhnia eupatorioides, L.
Ames ; Grinnell.

Joe-Pye Weed. Eupatorium purpureum, L.
Ames ; Grinnell ; Charles City.

Boneset. Eupatorium perfoliatum, L.
Ames ; Indianola ; Charles City ; Fayette ; Burlington.

White Snakeroot. Eupatorium ageratoides, L.
Ames ; Grinnell.

Aster. Aster sericeus, Vent.
Ames ; Grinnell ; Charles City.

Aster patens, Ait.
Ames ; Grinnell.

Aster lævis, L.
Grinnell.

Aster azureus, Lindl.
Grinnell.

Aster undulatus, L.
Grinnell.

Aster cordifolius, L.
Ames.

Aster multiflorus, Ait.
Ames ; Grinnell.

Aster dumosus, L. (?)
Ames.

Aster Tradescanti, L.
Grinnell.

Aster miser, L. (?)
Ames.

Aster simplex, Willd. (?)
Ames ; Grinnell.

Aster tenuifolius, L. (?)
Grinnell.

Aster carneus, Nees.
Ames.

Aster puniceus, L.
Grinnell.

Aster prenanthoides, Muhl.
Ames.

Aster oblongifolius, Nutt.
Grinnell. Seems to vary from typical

Aster Novæ Angliæ, L.
Ames.

Horse Weed. Erigeron Canadense, L.
Grinnell. A rapidly spreading weed.

Erigeron divaricatum, Michx.
Ames. A native weed, of a low and spreading habit, which is intruding on our pastured prairies.

Robin's Plantain. Erigeron bellidifolium, Muhl.
Burlington.

Common Fleabane. Erigeron Philadelphicum, L.
Ames ; Charles City ; Fayette.

Daisy Fleabane. Erigeron annuum, Pers.
Ames; Grinnell.

Daisy Fleabane. Erigeron strigosum, Muhl.
Ames; Charles City.

Boltonia glastifolia, L'Her.
Ames.

Golden Rod. Solidago latifolia, L.
Ames.

Solidago rigida, L.
Ames; Grinnell; Charles City; Burlington.

Solidago Riddellii, Frank.
Ames.

Solidago ulmifolia, Muhl.
Ames.

Solidago nemoralis, Ait.
Grinnell.

Solidago Missouriensis, Nutt. (?)
Ames.

Solidago Canadensis, L.
Ames; Indianola; Grinnell.

Solidago lanceolata, L.
Ames, Grinnell.

Compass Plant. Silphium laciniatum, L.
Ames; Charles City; Fayette; Burlington. Tais curious plant is found abundantly on the moister parts of the prairies, but cultivation soon drives it out.

Prairie Dock. Silphium terebenthinaceum, L.
Burlington.

Cup Plant. Silphium perfoliatum, L.
Ames; Charles City; Burlington. At Grinnell it seems to vary from the typical form.

Parthenium integrifolium, L.
Charles City.

Ragweed. Ambrosia bidentata, Michx.
Burlington.

Great Rag-weed. Ambrosia trifida, L.
Ames; Charles City.

——— var. integrifolia.
Ames.

Bitter-weed. Ambrosia artemisiæfolia, L.
Ames; Charles City.

Ambrosia pilostachya, DC.
Ames.
These species of Ambrosia are vile weeds, and should be eradicated as rapidly as possible.

Cock ebur. Xanthium strumarium, L.
Ames; Burlington. A bad weed on low grounds.

Ox ye. Heliopsis lævis, Pers.
Ames; Indianola.

——— var. scabra.
Grinnell.

Purple Cone-flower. Echinacea angustifolia, DC.
Ames; Grinnell; Burlington.

Cone-flower. Rudbeckia laciniata, L.
Ames; Charles City.

Rudbeckia triloba, L.
Ames; Grinnell.

Rudbeckia hirta, L.
Ames; Charles City.

Lepachys pinnata, Torr. & Gr.
Indianola; Grinnell.

Comm'n Sun-flower. Helianthus *annuus*, L.
Ames. Has become so thoroughly naturalized as to have much the appearance of a native plant.

Helianthus rigidus, Desf.
Ames; Indianola; Grinnell.

Helianthus lætiflorus, Pers.
Ames; Charles City.

Helianthus grosse-serratus, Martens.
Ames; Grinnell.

Helianthus doronicoides, Lam. (?)
Ames.

Actinomeris. Actinomeris squarrosa, Nutt.
Ames.

Tick-seed. Coreopsis palmata, Nutt.
Ames; Charles City.

Beggar-Ticks, Spanish Needles. Bidens frondosa, L.
Ames; Indianola.

Swamp Beggar-Ticks. Bidens connata, L.
Ames.

——— var. comosa.
Ames.

Bur-Marigold. Bidens chrysanthemoides, Michx.
Ames; Grinnell.
These species of Bidens are often allowed to grow in corn-fields, along ditches, and in fence rows, by slovenly farmers.

Fetid Marigold. Dysodia chrysanthemoides, Lag.
Ames; Grinnell.

Sneeze-Weed. Helenium autumnale, L.
Ames; Grinnell.

Leptopoda brachypoda, Torr. & Gr.
Indianola.

May-Weed. Maruta *cotula*, DC.
Ames; Charles City; Burlington—common along roadsides.

Garden Chamomile. Anthemis *nobilis*, L.
Roadsides at Ames.

Milfoil. Achillea Millefolium, L.
Ames; Indianola: Charles City; Burlington.

Ox-Eye Daisy, White-Weed. Leucanthemum *vulgare*, Lam.
Ames.
Lately introduced, and perhaps not yet established. A miserable weed.

Wild Wormwood. Artemisia dracunculoides, Pursh.
Ames.

Mugwort, or Sage Brush. Artemisia Ludoviciana, Nutt.
Ames; Grinnell.

Biennial Wormwood Artemisia biennis, Willd.
Ames.

Common Wormwood. Artemisia *Absinthium*, L.
Charles City. Escaped from gardens.

Everlasting. Antennaria plantaginifolia, Hook.
Ames; Indianola; Charles City.

Fire-Weed. Erechthites hieracifolia, Raf.
Ames; Grinnell.

Indian Plantain. Cacalia tuberosa, Nutt.
Ames; Grinnell; Charles City.

Golden Ragwort. Senecio aureus, L.
Ames; Indianola; Grinnell; Charles City; Burlington.

Var. *Balsamitæ*.
Burlington.

Bluebottle. Centaurea *Cyanus*, L.
Ames—introduced lately from the east.

Common Thistle. Cirsium *lanceolatum*, Scop.
Burlington.

Tall Thistle. Cirsium altissimum, Spreng.
Ames; Indianola; Charles City. The common Thistle of our fields and woodlands.

Yellow Thistle. Cirsium horridulum, Michx.
Burlington.

Canada Thistle. Cirsium *arvense*, Scop.
Keokuk; Ottumwa.
I found this outlawed plant growing in the streets of the city of Keokuk in the autumn of 1870, and am informed on good authority that about Ottumwa it is also found. The strictest enforcement of our State law on this subject should be demanded by every enterprising farmer and gardener.

Burdock. Lappa *officinalis*. Allioni, var. *Major*.
Ames; Burlington. A detestable weed.

Dwarf Dandelion. Krigia Virginica, Willd.
Burlington.

Troximon. Troximon cuspidatum, Pursh.
Ames; Grinnell.

Long bearded Hawk-Weed. Hieracium longipilum, Torr.(?)
Ames.

Rattlesnake-Weed. Hieracium venosum, L.
Grinnell; Fayette.

White Lettuce. Nabalus albus, Hook.
Ames; Burlington.

Nabalus asper, Torr. & Gray.
Ames; Grinnell.

Nabalus crepidineus, DC.
Ames.

Dandelion. Taraxacum Dens-leonis, Desf.
Ames; Indianola; Charles City; Fayette; Burlington.
Probably introduced from the east at all these localities.

Wild Lettuce. Lactuca Canadensis, L.
Ames.

——— var. sanguinea, Torr. & Gr.
Ames.

Prickly Lettuce. Lactuca *Scariola*, L.
Ames.

False Lettuce. Mulgedium Floridanum, DC.
Grinnell.

Sow Thistle. Sonchus *asper*, Vill.
Grinnell.

LOBELIACEÆ.

Cardinal Flower. Lobelia cardinalis, L.
Ames; Burlington.

Great Lobelia. Lobelia syphilitica, L.
Ames; Indianola; Grinnell; Burlington.

Indian Tobacco. Lobelia inflata, L.
Cedar Rapids.

Spiked Lobelia. Lobelia spicata, Lam.
Ames; Grinnell; Charles City.

Lobelia paludosa, Nutt.
Ames; Burlington.

CAMPANULACEÆ.

Harebell. Campanula rotundifolia, L.
Fayette.

Marsh Bellflower. Campanula aparinoides, Pursh.
Ames; Charles City.

Tall Bellflower. Campanula Americana, L.
Ames; Indianola; Grinnell; Burlington.

Venus' Looking-glass. Specularia perfoliata, A. DC.
Ames; Grinnell; Burlington.

ERICACEÆ.

Shin Leaf. Pyrola elliptica, Nutt.
Cedar Rapids.

Indian Pipe. Monotropa uniflora, L.
Ames; Grinnell.

Pine Sap. Monotropa Hypopitys, L.
Fayette.

PLANTAGINACEÆ.

Common Plantain. Plantago *major*, L.
Ames; Burlington, common.

Rib-grass. Plantago *lanceolata*, L.
Ames.

PRIMULACEÆ.

Shooting Star. Dodecatheon Meadia, L.
Charles City; Fayette; Burlington.

Tufted Loosestrife. Lysimachia thyrsiflora, L.
Ames.

Loosestrife. Lysimachia ciliata, L.
Ames.

Lysimachia longifolia, Pursh.
Ames; Grinnell.

BIGNONIACEÆ.

Trumpet Creeper. Tecoma radicans, Juss.
Burlington.

SCROPHULARIACEÆ.

Mullein. Verbascum *Thapsus*, L.
Ames; Burlington. A slovenly weed coming to us from the East.

Butter and Eggs. Linaria *vulgaris*, Mill.
Indianola; Des Moines; Charles City. "A pernicious weed."

Figwort. Scrophularia nodosa, L.
Ames; Charles City.

Beard Tongue. Pentstemon pubescens, Solander.
Burlington.

Pentstemon grandiflorus, Fraser.
Dubuque.

Monkey Flower. Mimulus ringens, L.
Ames; Grinnell. At the latter place Professor Parker describes it as having a stem four-angled; two opposite sides convex, the other two deeply concave

Culver's Physic. Veronica Virginica, L.
Ames; Grinnell; Charles City.

Water Speedwell. Veronica Anagallis, L.
Ames.

Purslane Speedwell. Veronica peregrina, L.
Ames.

Purple Gerardia. Gerardia purpurea, L.
Ames; Grinnell.

Slender Gerardia. Gerardia tenuifolia, Vahl.
Ames; Grinnell; Burlington.

Gerardia quercifolia, Pursh.
Burlington.

Gerardia auriculata, Michx.
Ames; Grinnell.

Scarlet Painted Cup. Castilleia coccinea, Spreng.
Grinnell; Charles City; Fayette; Burlington.

Castilleia sessiliflora, Pursh.
Ames; Fayette,

Louse-wort. Pedicularis Canadensis, L.
Ames; Indianola; Grinnell; Charles City; Fayette; Burlington.

Pedicularis lanceolata, Michx.
Ames; Grinnell; Charles City. Seems to vary from the typical form.

ACANTHACEÆ.

Ruellia ciliosa, Pursh.
Indianola.

VERBENACEÆ.

Blue Vervain. Verbena hastata, L.
Ames; Grinnell; Charles City; Burlington.

White Vervain. Verbena urticifolia, L.
Ames; Grinnell; Charles City; Burlington.

Hoary Vervain. Verbena stricta, Vent.
Ames; Charles City; Burlington. At Ames flowers not "blue," but decidedly purple. Stem occasionally branched, and leaves sometimes dentate.

Low Vervain. Verbena bracteosa, Michx.
Ames; Grinnell; Charles City.

LABIATÆ.

Wood Sage. Teucrium Canadense, L.
Ames; Grinnell; Burlington.

Spearmint. Mentha *viridis*, L.
Burlington.

Wild Mint. Mentha Canadensis, L.
Ames.

Lycopus Europæus, L. var. sinuatus, Gr.
Ames; Grinnell.

Basil. Pycnanthemum lanceolatum, Pursh.
Ames; Grinnell; Charles City; Burlington.

Wild Bergamot. Monarda fistulosa, L.
Ames; Indianola; Burlington.

Blephilia hirsuta, Benth.
Ames.

Giant Hyssop. Lophanthus scrophulariæfolius, Benth.
Ames; Grinnell.

Anise Hyssop. Lophanthus anisatus, Benth.
Grinnell.

Catnip. Nepeta *cataria*, L.
Ames; Charles City; Burlington.

Gill. Nepeta *Glechoma*, Benth.
Indianola.

False Dragon-head. Physostegia Virginiana, Benth.
Ames.

Heal-all. Brunella vulgaris, L.
Ames; Grinnell; Charles City.

Skull-cap. Scutellaria versicolor, Nutt.
Burlington.

Skull-cap. Scutellaria parvula, Michx.
Ames; Grinnell.

Scutellaria lateriflora, L.
Ames.

Common Horehound. Marubium *vulgare*, L.
Burlington.

BORRAGINACEÆ.

False Gromwell. Onosmodium Carolinianum, DC. (?)
Ames. Our plant seems intermediate between *O. Carolinianum* and *molle*. Professor Parker gives what I presume is the same plant as "an undescribed variety of O. Virginianum."

Gromwell. Lithospermum latifolium, Michx.
Ames.

Hairy Puccoon. Lithospermum canescens, Lehm.
Ames; Charles City; Grinnell; Fayette; Burlington.

Lithospermum longiflorum, Spreng.
Ames; Charles City; Fayette.

Lungwort. Mertensia Virginica, DC.
Ames; Indianola; Grinnell; Charles City; Fayette; Burlington.

Stickseed. Echinospermum *Lappula*, Lehm.
Ames; Grinnell; Charles City.

Beggar's Lice. Cynoglossum Morissoni, DC.
Ames. Both last mentioned plants are weeds.

HYDROPHYLLACEÆ.

Waterleaf. Hydrophyllum Virginicum, L.
Ames; Grinnell.

Ellisia. Ellisia ambigua, Nutt.
Ames; Indianola; Grinnell; Fayette.

POLEMONIACEÆ.

Greek Valerian. Polemonium reptans, L.
Fayette; Burlington.

Wild Sweet-william. Phlox maculata, L.
Grinnell; Charles City; Burlington.

Wild Pink. Phlox pilosa, L.
Ames; Indianola; Grinnell; Charles City; Fayette. The common Wild Pink of the prairies.

Wood Pink. Phlox procumbens, Lehm.
Ames. Common in timber land.

Phlox divaricata, L.
Grinnell; Burlington.

Phlox bifida, Beck.
Burlington.

CONVOLVULACEÆ.

Hedge Bindweed. Calystegia sepium, R. Br.
Ames; Charles City; Grinnell; Burlington. A common and troublesome weed in fields.

Dodder. Cuscuta Gronovii, Willd.
Ames.

Cuscuta glomerata, Choisy.
Ames; Indianola.

SOLANACEÆ.

Black Nightshade. Solanum *nigrum*, L.
Ames, and elsewhere. Flowers purplish tinged! ⅛ inch broad. Berries eaten in some parts of the State.

Ground Cherry. Physalis viscosa, L.
Ames; Grinnell?

Physalis Pennsylvanica, L.
Ames; Charles City.

"Jimson," or Thorn Apple. Datura *Stramonium*, L.
Ames, Indianola, Knoxville, and Burlington. An unsightly and poisonous weed.

GENTIANACEÆ.

Five-flowered Gentian. Gentiana quinqueflora, Lam.
Ames.

Fringed Gentian. Gentiana crinita, Frœl.
Ames; Grinnell.

Whitish Gentian. Gentiana alba, Muhl.
Ames.

Closed Gentian. Gentiana Andrewsii, Griseb.
Ames; Grinnell; Charles City.

Soapwort Gentian. Gentiana Saponaria, L.
Ames.

Gentiana puberula, Michx.
Ames.

APOCYNACEÆ.

Spreading Dogbane. Apocynum androsæmifolium, L.
Ames; Charles City; Burlington.

Indian Hemp. Apocynum cannabinum, L.
Ames; Burlington.

ASCLEPIADACEÆ.

Milkweed or Silk-weed. Asclepias Cornuti, Decaisne.
Ames; Indianola; Charles City; Burlington.

Purple Milkweed. Asclepias purpurascens, L.
Ames.

Swamp Milkweed. Asclepias incarnata, L.
Ames; Grinnell.

Asclepias obtusifolia, Michx.
Grinnell.

Pleurisy-root. Asclepias tuberosa, L.
Ames; Indianola; Grinnell; Charles City; Burlington.

Whorled Milkweed Asclepias verticillata, L.
Ames; Burlington.

Green Milkweed. Acerates viridiflora, Ell.
Ames; Charles City.

OLEACEÆ.

White Ash. Fraxinus Americana. L.
Ames; Burlington.

ARISTOLOCHIACEÆ.

Wild Ginger. Asarum Canadense, L.
Ames; Fayette; Burlington.

CHENOPODIACEÆ.

Lamb's Quarters. Chenopodium *album*, L.
Ames.

——— var. *Boscianum*, Gr.
Ames. Both common in gardens.

Maple-leaved Goose-foot. Chenopodium hybridum, L.
Ames.

AMARANTACEÆ.

Pig-weed. Amarantus *retroflexus*, L.
Ames. Several other species of Amarantus are found here, but they have not yet been fully identified. All are weeds, the most prominent of which is the common Tumble-weed (A. *albus*, L. ?)

POLYGONACEÆ.

Prince's Feather. Polygonum *orientale*, L.
Ames.

Polygonum. Polygonum Pennsylvanicum, L.
Ames.

Lady's Thumb. Polygonum *Persicaria*, L.
Ames; Burlington.

Smartweed. Polygonum Hydropiper, L.
Ames; Burlington.

Water Persicaria. Polygonum amphibium, L., var. terrestre, Willd.
Ames.

Polygonum Virginianum, L.
Ames.

Knotgrass. Polygonum aviculare, L.
Ames; Burlington.

Larger Knotgrass. Polygonum ramosissimum, Michx.
Ames.

Black Bindweed. Polygonum *Convolvulus*, L.
Ames; Burlington.

Climb'g False Buck-wheat. Polygonum dumetorum. L. (?)
Grinnell.

Buckwheat. Fagopyrum *esculentum*, Mœnch.
Ames. Escaped from cultivation.

Pale Dock. Rumex Britannica, L.
Ames.

Curled Dock. Rumex *crispus*, L.
Ames; Charles City.

Sheep Sorrel. Rumex *Acetosella*, L.
Ames. Lately introduced from the East, where it is abundant in sterile and worn fields, as an unwelcome weed.

SANTALACEÆ.

Bastard Toad-flax. Comandra umbellata, Nutt.
Ames; Charles City; Grinnell; Burlington.

EUPHORBIACEÆ.

Spurge. Euphorbia serpyllifolia, Pers.
Ames; Charles City.

Spotted Spurge. Euphorbia maculata, L.
Ames ; Charles City.

Euphorbia hypericifolia, L.
Ames.

Euphorbia marginata, Pursh. (?)
Grinnell.

Euphorbia corollata, L.
Ames ; Grinnell ; Charles City ; Burlington.

Three-seeded Mercury. Acalypha Virginica, L.
Ames ; Charles City.

URTICACEÆ.

Slippery or Red Elm. Ulmus fulva, Michx.
Ames ; Charles City ; Fayette ; Burlington.

White Elm. Ulmus Americana, L.
Ames ; Charles City ; Fayette ; Burlington.

Hackberry. Celtis occidentalis, L.
Ames.

Red Mulberry. Morus rubra, L.
Ames.

Wood-Nettle. Laportea Canadensis, Gaudich.
Ames ; Grinnell.

Clear-weed. Pilea pumila, Gray.
Ames.

Hemp. Cannabis *sativa*, L.
Ames. Escaped to road-sides and fence-rows.

Hop. Humulus Lupulus, L.
Ames. Found abundantly in timber land. Certainly indigenous. Also at Burlington.

PLATANACEÆ,

Button-wood or Sycamore. Platanus occidentalis, L.
Ames ; Fayette ; Burlington.

JUGLANDACEÆ.

Butternut. Juglans cinerea, L.
Ames ; Fayette ; Burlington.

Black Walnut. Juglans nigra, L.
Ames ; Fayette ; Burlington.

Pecan-nut. Carya oliviæformis, Nutt.
Dr. White in his Report on the Geology of Iowa, gives this as one of the trees of Iowa. I have not seen it in the State.

Shell-bark Hickory. Carya alba, Nutt.
Ames ; Burlington.

Bitternut. Carya amara, Nutt.
Ames.

CUPULIFERÆ.

White Oak. Quercus alba, L.
Ames ; Burlington.

Bur-Oak. Quercus macrocarpa, Michx.
Ames ; Burlington.

Chinquapin Oak. Quercus prinoides, Willd.
On authority of Dr. Vasey in 2d vol. Am. Ent. and Botanist, page 282.

Laurel Oak. Quercus imbricaria, Michx.
In the State, on the authority of Dr. White.

Black Oak. Quercus tinctoria, Bartram.
In the State, on the authority of Dr. White.

Red Oak. Quercus rubra, L.
Burlington.

Pin Oak. Quercus palustris, Du Roi.
Burlington.

Hazel-nut Corylus Americana, Walt.
Ames ; Fayette ; Burlington.

Beaked Hazel-nut. Corylus rostrata, Ait.
Fayette.

Iron-wood. Ostrya Virginica, Willd.
Ames ; Burlington.

Blue Beech. Carpinus Americana, Michx.
Along Des Moines River bluffs, Boone county.

BETULACEÆ,

White Birch. Betula alba, var. populifolia, Spach.
Fayette.

River or Red Birch. Betula nigra, L.
On authority of Dr. White.

SALICACEÆ.

Willow. Salix —— —— many species, but not yet fully identified.

Aspen. Populus tremuloides, Michx.
Ames; Charles City; Burlington.

Downy Poplar. Populus heterophylla, L.
Fayette.

Cotton-wood. Populus monilifera, Ait.
Ames; Fayette; Burlington.

Angled Cotton-wood. Populus angulata, Ait.
Ames.

CONIFERÆ.

Several Pines and Firs grow in the northern portions of the State, but I have been unable as yet to secure reliable information regarding them.

Red Cedar. Juniperus Virginiana, L.
On Rocky bluffs of Des Moines river, Boone county, and in the eastern part of the State along Cedar River; Burlington.

ARACEÆ.

Indian Turnip. Arisæma triphyllum, Torr.
Ames; Indianola; Grinnell; Charles City; Fayette; Burlington.

Green Dragon. Arisæma Dracontium, Schott.
Ames.

Calamus. Acorus Calamus, L.
Hamilton county.

LEMNACEÆ

Duckweed. Lemna minor, L.
Ames.

Lemna polyrrhiza, L.
Ames.

TYPHACEÆ.

Cat-tail Flag. Typha latifolia, L.
Ames; Burlington.

ALISMACEÆ.

Water Plantain. Alisma Plantago, L. var Americanum.
Ames; Charles City.

Arrow head. Sagittaria variabilis, Engelm.
Ames; Charles City; Burlington.

Sagittaria graminea, Michx.
Ames.

ORCHIDACEÆ.

Showy Orchis. Orchis spectabilis, L.
Ames; Fayette.

Habenaria viridis, R. Br. var. bracteata, Richenbach.
Ames.

Fringed Orchis. Habenaria, leucophæa, Gr.
Ames; Grinnell; Charles City.

Ladies' Tresses. Spiranthes cernua, Richard.
Ames.

Putty-root. Aplectrum hyemale, Nutt.
Fayette.

Small White Lady's Slipper. Cypripedium candidum, Muhl.
Ames; Grinnell; Charles City.

Smaller Yellow Lady's Slipper. Cypripedium parviflorum, Salisb.
Grinnell; Burlington.

Larger Yellow Lady's Slipper. Cypripedium pubescens, Willd.
Ames; Indianola; Charles City; Fayette.

Showy Lady's Slipper. Cypripedium spectabile, Swartz.
Ames; Charles City; Fayette; Burlington.

AMARYLLIDACEÆ.

Star grass. Hypoxys erecta, L,
Ames; Indianola; Grinnell; Charles City; Fayette; Burlington.

IRIDACEÆ.

Blue Flag. Iris versicolor, L.
Ames; Charles City; Fayette; Burlington.

Blue-eyed Grass. Sisyrinchium Bermudiana, L.
Indianola ; Fayette.
Vars. anceps, and albidum, at Ames.
Var. mucronatum, at Ames and Grinnell.

DIOSCOREACEÆ.

Wild Yam-root. Dioscorea villosa, L.
Ames ; Charles City ; Grinnell.

SMILACEÆ.

Greenbrier. Smilax hispida, Muhl.
Ames.

Carrion Flower. Smilax herbacea, L.
Ames ; Grinnell.

LILIACEÆ.

Trillium sessile, L.
Burlington.

Trillium recurvatum, Beck.
Burlington.

Large White Trillium. Trillium grandiflorum, Salisb.
Fayette ; Burlington.

Trillium erectum, L., var. album.
Grinnell.

Nodding Trillium. Trillium cernuum, L.
Fayette.

Dwarf White Trillium. Trillium nivale, Riddell.
Burlington. Rare.

Bellwort. Uvularia grandiflora, Smith.
Ames ; Grinnell. (?)

Uvularia perfoliata, L.
Fayette ; Burlington.

Uvularia sessilifolia, L.
Fayette.

False Spikenard. Smilacina racemosa, Desf.
Ames ; Fayette ; Burlington.

Smilacina stellata, Desf.
Ames ; Grinnell ; Fayette ; Burlington.

Great Solomon's Seal. Polygonatum giganteum, Dietrich.
Ames ; Grinnell.

Wild Orange-red Lily. Lilium Philadelphicum, L.
Ames ; Grinnell ; Charles City ; Burlington.

Turk's-cap Lily. Lilium superbum, L.
Ames ; Charles City ; Burlington.

Yellow Adder's Tongue. Erythronium Americanum, Smith.
Fayette.

White Dog's-tooth Violet. Erythronium albidum, Nutt.
Ames ; Indianola ; Grinnell ; Fayette ; Burlington

Wild Leek. Allium tricoccum, Ait.
Ames.

Wild Garlic. Allium Canadense, Kalm.
Ames ; Charles City.

JUNCACEÆ.

Rush. Juncus tenuis, Willd.
Ames.

COMMELYNACEÆ.

Spiderwort. Tradescantia Virginica, L.
Ames ; Charles City ; Grinnell ; Burlington

Tradescantia pilosa, Lehm.
Fayette.

CYPERACEÆ.

Galingale. Cyperus Michauxianus, Schultes.
Ames.

Spike Rush. Eleocharis palustris, R. Br.
Ames.

Eleocharis acicularis, R. Br.
Ames.

Great Bulrush. Scirpus validus, Vahl.
Ames.

Scirpus atrovirens, Muhl.
Ames.

Cotton Grass. Eriophorum polystachyon, L.
Ames ; Grinnell.

Sedge.

Carex bromoides, Schk.
Ames.

Carex disticha, Huds.
Ames.

Carex vulpinoidea, Michx.
Ames.

Carex sparganoides, Muhl.
Ames.

Carex cephalophora, Muhl.
Ames.

Carex rosea, Schk.
Ames

Carex lagopodioides, Schk.
Ames.

Carex adusta, Boott.
Ames.

Carex straminea, Schk. var. Meadii.
Ames.

Carex stricta, Lam.
Ames.

Carex grisea, Wahl.
Ames.

Carex lanuginosa, Michx.
Ames.

Carex hystricina, Willd.
Ames.

Carex folliculata, L.
Ames.

Carex longirostris, Torr.
Ames.

GRAMINEÆ.

Timothy.

Phleum *pratense*, L.
Ames. Cultivated largely, and becoming spontaneous.

Red-top.

Agrostis vulgaris, With.
Ames. Cultivated; becoming spontaneous.

Drop-seed Grass.

Muhlenbergia glomerata, Trin.
Ames.

Porcupine Grass.

Stipa spartea, Trin.
Ames.

Cord Grass.

Spartina cynosuroides, Willd.
Ames.

Muskit Grass.

Bouteloua hirsuta, Lagasca.
Ames.

Bouteloua curtipendula, Gray.
Ames.

Orchard Grass.

Dactylis *glomerata*, L.
Ames. Introduced.

Glyceria nervata, Trin.
Ames.

Wire Grass.

Poa compressa, L.
Grinnell. Probably introduced.

Blue Grass.

Poa pratensis, L.
Ames. Introduced as a pasture and lawn grass.

Eragrostis reptans, Nees.
Ames.

Eragrostis *pœoides*, Beauv.
Ames.

Var. *megastachya*.
Ames.

Eragrostis Frankii, Myer (?)
Ames.

Fescue Grass.

Festuca tenella, Willd.
Ames.

Chess.

Bromus *secalinus*, L.
Ames.
In wheat-fields.

Wild Chess.

Bromus Kalmii, Gray.
Ames.

Bromus ciliatus, L. var purgans.
Ames.

Reed.

Phragmites communis, Trin.
Ames.

Quack, or Grass. Triticum repens, L.
Ames.
Introduced ?

Squirrel-tail Grass. Hordeum jubatum, L.
Ames.
Found along railroad. Perhaps introduced.

Wild Rye. Elymus Canadensis, L.
Ames.

Bottle-brush Grass. Gymnostichum Hystrix, Schreb.
Ames.

Vanilla Grass. Hierochloa borealis, Roem & Schultes.
Ames.
In dry woods !

Sweet Vernal Grass. Anthoxanthum *odoratum*, L.
Ames.
Introduced.

Panicum *glabrum*, Gaudin.
Ames.

Finger-Grass. Panicum *sanguinale*, L.
Ames.

Prairie Grass. Panicum agrostoides, L.
Ames.

Old Witch Grass. Panicum capillare, L.
Ames. Common.
Breaks off at the ground in early winter, and blows all over the prairies.

Panicum latifolium, L.
Ames.

Panicum xanthophysum, Gray.
Ames.

Panicum dichotomum, L.
Ames.
Several forms of this variable species are found here.

Barnyard Grass. Panicum *Crus-galli*, L.
Ames.
Introduced. A weed.

Green Foxtail. Setaria *viridis*, Beauv.
Ames.
A weed in fields and gardens.

Sand Bur, or Bur Grass. Cenchrus tribuloides, L.
Cedar Rapids.

Beard Grass. Andropogon furcatus, Muhl.
Ames.

Andropogon scoparius, Michx.
Ames.

Indian Grass. Sorghum nutans, Gray.
Ames.
Common on the prairies.

EQUISETACEÆ.

Common Horsetail. Equisetum arvense, L.
Ames ; Charles City.
At Ames, also, the "accidental state"—var. serotinum, Myer. —"in which the sterile plant produces a spike of fruit from its summit."

Equisetum palustre, L.(?)
Ames.
Annual stemmed ; main stems 12-14 grooved, and branches 6-9 grooved !

Scouring Rush. Equisetum hyemale, L.
Ames.

FILICES.

Polypody. Polypodium vulgare, L.
Ames (on Des Moines River bluffs.)

Maidenhair Fern. Adiantum pedatum, L.
Ames ; Charles City.

Spleenwort. Asplenium thelypteroides, Michx.
Ames.

Walking Fern. Camptosorus rhizophyllus, Link.
Ames (on Des Moines River bluffs.)

Bladder Fern. Cystopteris fragilis, Bernh.
Ames.

Sensitive Fern. Onoclea sensibilis, L.
Ames.

Moonwort. Botrychium, Virginicum, Swartz.
Ames.

NOTE.—As the preceding catalogue is as yet very imperfect, persons noting omissions or errors will confer a favor by corresponding with C. E. Bessey, Ames, Iowa.

REPORT OF THE DEPARTMENT OF PHYSICS AND MECHANICS.

To the Honorable Board of Trustees of the Iowa Agricultural College:

GENTLEMEN: — I beg leave to present the following report regarding the apparatus and other facilities for instruction needed in the department of Physics and Mechanics.

During the past year about two thousand dollars have been expended for apparatus relating to heat and light mainly, but care has been taken to select instruments having as wide a range of application as possible. The necessity for apparatus is so urgent that I hope that this year a very much larger sum will be appropriated.

This apparatus is needed—

To enable the student to acquire knowledge that is beyond his reach without it.

To enable the student to make more rapid progress.

And most important of all, perhaps, to train the student to experiment and observe; to inculcate those habits of thought that fit him to discover new truth. This is one of the highest aims of the "New Education," to send young men into the active pursuits of life, prepared by their peculiar training to extend the boundaries of human knowledge, as they can only be extended, by experiment and observation. The study of science from text-books alone not only fails to give such training, but engenders habits of thought inconsistent with it. Such teaching is a failure, and worse than a failure, as regards the great object it is desirable to attain.

To accomplish this important object, the *best* apparatus is necessary. It must be capable of, and the student must be trained to attain, the utmost precision. Some single instruments of this class cost from $1,000 to $2,000, and the instruments must accompany these to render them available for all the purposes for which they

may be used. I hope, therefore, that ten thousand ($10,000) dollars at least, and a larger sum, if such is possible, may be obtained for the purchase of apparatus for this department.

I have made a somewhat detailed estimate of the physical apparatus, models of machinery, and models for the study of drawing, needed to do full justice to the classes already organized. The sum total is thirty thousand dollars. I have seen it stated that the University of California expended that amount for apparatus the first year, and there are many institutions in the country that have larger sums invested in such property.

The sum named above is not expected from the interest fund of this year, but is asked for with the hope that the State legislature will refund the money that has been expended for heating buildings and for other purposes not contemplated in the act giving the lands to the State.

Regarding the workshop, I have the following to submit for your consideration:

Suppose it to be the primary object of the workshop with its equipment to furnish instructive labor for the students in mechanics arts.

To accomplish this object, the work must present as great a variety as possible, the object being to make the student acquainted with the resources at his command, while he acquires a fair proficiency in the use of tools.

The work being done almost wholly by students who are not skilled workmen, it can not be expected that articles can be manufactured for sale at a profit, for no business man would expect to run a shop on a paying basis, with the workmen nearly all apprentices, whose object was to learn as rapidly as possible.

At the Worcester Free Institute is a workshop in full operation, whose object is such as I have indicated above. The building and its equipments, which are as full and complete as could be desired, were given to the institute, which received in addition $5,000 to be expended in stock, and the interest of $50,000 to provide for contingencies; and yet, says the last catalogue, "with all these advantages, the work done by the students is hardly an adequate compensation for the expense involved in their instruction."

Students should be instructed in the *best kind of work*. "Miscellaneous jobbing and inferior work are not the models for a boy to study, nor are second-rate workmen his proper instructors." "*Nothing is too good for a boy.*"

I would suggest as accomplishing the object better than anything else I know, that the business of the shop be the manufacture of mechanical models and such pieces of apparatus as can be made here. This will furnish a great variety of the best work, will require no great outlay for material, and the product will be worth to the college at least what it costs.

The workshop connected with this institution is already provided with power and a few tools, at a cost altogether of $6,400, $4,400 of which have been expended during the past year. Other tools are needed to permit a greater variety of work, and some should be duplicated to furnish work for a greater number of students. It is of the utmost importance to the success of the enterprise that there should be employed, two *first-class* workmen, one in wood and the other in metal, intelligent men, of good moral character, having a good English education, who shall lay out work for and give instruction to students, and perform the nicer work that students cannot do. I would recommend that an appropriation of ten thousand dollars ($10,000) be asked for, to furnish tools and material for the purposes I have named. This is a small sum for the great object to be gained. Illinois has given $25,000 for the workshop at her Industrial School, and the amount invested at the Worcester free Institute must be $100,000. The sum that I ask for, together with the amounts previously expended here for the workshop and its equipments, is considerably less than the least of the two mentioned above, but I think with it, good work can be done, and good instruction given.

WM. A. ANTHONY,
Prof. of Physics and Mechanics.

REPORT ON CHEMISTRY.

Hon. A. S. Welch, President of the Board of Trustees:

SIR: I have the honor of submitting the following report of the Department of Chemistry for the year 1871. The upper rooms of the new laboratory were ready for use soon after the opening of the first term, and proved hardly sufficient for our accommodation, as there were thirteen more students than tables. The experience of the year has proved to me, that, so far as completed, our laboratory is not excelled in convenience by any in the world. This I can say, after having worked in the largest and best laboratories in this country, and in the newest and best in Europe, and after having visited nearly all that are of any note. Lack of funds compelled us to leave the fittings of the laboratory in an incomplete state. Additional cases, tables, etc. are needed. A room is needed in which the Professor can perform the numerous analysis that are submitted to him. It is exceedingly desirable that each student should have a table to himself, and it is almost necessary that students pursuing different studies should work in different rooms. These and other needs I hope to see provided for in the extension of the laboratory. In the meanwhile the preparation room, that has never been fitted up, can at a small expense be made to serve temporarily as a professor's workroom. For making the necessary completions and provisions, I estimate that $450 will be needed.

During the first term, the following classes were taught:

Inorganic Chemistry, by recitations, lectures, and laboratory practice.

Organic Chemistry, by lectures, text-book, and laboratory practice.

Quantitative Analysis, by laboratory practice.

Each of these classes received daily instruction.

During the second term:

Inorganic Chemistry, was taught by text-book, lectures, and laboratory work.

Theoretical Chemistry, by lectures, and recitations from notes.

Qualitative Analysis, by laboratory work.

Agricultural Chemistry, by text-book and lectures.

Physiological Chemistry, by text-book and lectures.

Quantitative Analysis, by laboratory practice.

But few experiments were performed before the classes, owing to a lack of apparatus. Such experiments greatly lighten the labors of an instructor, rendering the class exercises far more interesting. The sum of $1,000 was asked for last year for the purpose of purchasing illustrative apparatus, much needed then, and which is even more needed this year. Several of the classes had the far greater advantage of performing with their own hands many illustrative experiments.

Each member of the class in Inorganic Chemistry performed a series of over 360 experiments, illustrating the facts, laws, and theories of the science. These experiments were performed by processes that are of daily use in manufacturing. Each student made such compounds as blueing, common ink, gunpowder, potash from ashes, sulphuric acid, etc., etc. Taught in this manner, chemistry trains all the senses, and the processes of reason required to attain successful results, are of the same character as are required in the daily operations of common life. In this country, President Eliot, of Harvard, was the first to introduce this method of teaching chemistry. The course in Inorganic Chemistry can be rendered more complete and less expensive by the purchase of more apparatus and with the larger class expected next year, at least $250 should be expended upon this branch.

Lectures on Organic Chemistry were given daily throughout the term, and daily work illustrating the facts and principles of the study, was performed by each student. Sugar was made from sheeting and saw-dust; starch was extracted from potatoes and grain; fruits were analyzed; parchment was made from paper; gun-cotton and collodion from cotton fibre; ether, chlorform, and alcohol, were manufactured; nitro-glycerine was made from glycerine,

which had been extracted from fat; hard, soft, and transparent soaps were made, etc., etc. Special experiments of considerable interest were performed with the various substances used by bakers to adulterate bread, and with the volatile ethers, some of which are used for flavoring agents, and others possess remarkable anæsthetic properties. All the arguments in favor of teaching Inorganic Chemistry by laboratory practice, (and they are so numerous and weighty that other institutions are rapidly adopting the plan,) are equally strong in favor of teaching Organic Chemistry in the same manner. Yet I believe that we were the first in this country to teach this branch in this manner. The need of apparatus for this class is urgent, and from $300 to $500 should be at once expended.

The class in Quantitative Analysis was necessarily quite limited in number as the college owns no analytical balance. The one used belongs to the State Geological Survey, and but a few of the most careful men in the class were allowed to work with it. If Quantitative Analysis is pursued to the extent that is laid down in our course, we should own at least five balances next year. These will cost between $400 and $500.

The peat found upon the farm was analyzed and ascertained to be a very valuable fertilizer. Quite a number of other quantitative analyses were made, and some very interesting experiments with burning fluids were performed. A report upon dangerous burning fluids was published from which a few extracts are given. The course in qualitative analysis was similar to that given last year, and consisted in the analysis of a series of compounds like salt, white lead, nickel coin, German silver, type metal, wood and coal ashes, &c., &c., fitting the students for the analysis of most substances of inorganic origin. The supply of apparatus in this branch is quite limited, and for the increased class that we will have next year at least $150 should be expended for re-agent bottles, &c.

In Agricultural Chemistry, Johnson's "How Crops Grow," and "How Crops Feed," treating of such subjects as "The Ash of Plants," "The Atmosphere as Relating to Vegetable Production," "The Soil," were used as text-books. Manures and their application were treated of in a series of lectures.

The analysis of soils and manures could not be pursued by the

class because there was no apparatus for this purpose. It is particularly unfortunate that just as the best fruit of the course is almost within the students grasp that he should fail to reach it for the lack of a proper stepping stone. The expenditure of $400 for balances and $500 for apparatus will enable us to give the necessary instruction in quantitative analysis and the "Analysis of Soils and Manures" next year. Without such expenditure, the instruction cannot be given.

The class in Mineralogy will need considerable apparatus, most of which we have on hand, and with the expenditure of $100 the class can be instructed properly.

The expenses of the laboratory per student were somewhat less this year than last, and were *much* lower than in any other institution with which I am acquainted. Yet several of my best students were obliged to leave the class on account of the expense, (about $17). The college last year allowed $10 per student upon their bills for chemicals. As the bills are incurred in the necessary pursuit of the study, and as without taking the study the student cannot graduate, this remitting of at least one-half his necessary expenses seems to me to be a wise provision. Were I to expend several hundred dollars per year in class experiments as many Professors do, no one would make objections. Yet these expenses charged to individual members are just as purely for their instruction, as if expended by me for class experiments. It seems clear to me, then, that the college should pay such expenses for the student as are necessary and unavoidable: As for instance, clearing, water, heating, gas, ventilation, assistance and chemicals necessarily used in the experiments, and that the student should be charged for all breakage, all chemicals needlessly used, and all extra labor caused by his thoughtlessness.

The expenses of the laboratory could be greatly decreased were we able to manufacture many of our chemicals and much of our apparatus. We have now a class of fifteen students who have been engaged in laboratory practice for nearly two years, and many of them would be glad to engage in such work. By the expenditure of $500 for the necessary apparatus, I am convinced that we could at once save at least $200 per year. We have had a number of applications from teachers for supplies of chemicals and apparatus, and

as advised, I have furnished them where it could be done without detriment to the college. I hope that we shall be able during the coming year to keep an extra stock of $1000 worth of chemicals and apparatus on hand, and thus avoid express rates, retail dealers' charges, as well as much inconvenience.

RECAPITULATION.

In order to teach certain classes and do certain work at all, the following expenses must be incurred:

Apparatus for analysis of oils and manures	$500 00
Balances for quantitative analysis	400 00
Necessary apparatus for larger class in Inorganic Chemistry	250 00
Necessary apparatus for larger class in second Qualitative Analysis	150 00
Apparatus for class in Mineralogy	100 00
Apparatus for class illustration	1000 00
Apparatus for manufacturing chemicals, etc	500 00
	$2,900 00

The following needs are pressing:

Fitting up laboratory and Professor's working and preparation room	$ 450 00
For procuring stock of apparatus and chemicals	1000 00
Apparatus for class in organic chemistry	300 00
	1750 00

Below will be found an abstract of an article I prepared some time ago upon the subject of burning oils and fluids, which may be of sufficient interest to be published in your forthcoming report:

Very respectfully submitted.

A. E. FOOTE.

BURNING FLUIDS.

Pure kerosene is of a pale bluish tint and has but little odor. If it, or any burning fluid, gives off sufficient vapor to light when a lighted match is brought near it, (at the highest summer heat), then it is dangerous. Before giving reliable tests, such as are prescribed by United States law, it may be of interest to give a short sketch of kerosene. Chemistry, the science that has furnished us with soap, glass, chloral, nitro-glycerine, the analine colors, and innumerable other comforts that make the life of the modern artizan more agreeable than that of the chieftains of antiquity, furnished the 19th century with gas, and when the farmer complained of her partiality toward his city cousin, kerosene, its worthy rival, was offered him. Before the first native "struck ile" among the barren hillsides of Pennsylvania before the thousands of speculators had rushed to the new found El Dorado, kerosene was manufactured from soft coal by distillations, repeated, and costly in their character. In petroleum, kind nature, having completed the first and most costly steps of the process, has left but little for man to do. The oil from the wells must be purified by distillation. First, the light and inflammable rhigolene is condensed. This boils violently at summer heat and in its evaporation produces intense cold. It is much used in surgery for freezing a finger or decayed tooth, after which the operation of removal is painless. Gasoline, largely advertised for use in gas machines, comes next. It is more dangerous than benzine for use in lamps, and may be considered as worthless in Iowa for making gas. It is more inflammable than gunpowder or benzine, and the cold of our winter condenses it in the gas-pipes, leaving the family adopting it to lament their folly in darkness and sorrow.

Benzine, much used for removing grease, paint, etc., passes over next. Though much less inflammable than naptha or gasoline, it is still too dangerous for lighting purposes. From benzine the chemist manufactures the beautiful analine dyes and inks now so popular. The black waste of the gas retorts, which a few years ago was an expensive nuisance, is now converted into the varied rainbow tints that dye the wools and most beautiful silks. Below 120° these

lighter oils are distilled—above that point kerosene begins to pass over. At a varying point the distillation is stopped, and we have left in the retort, parafine, and heavy oils used for lubricating purposes. The manufacturer *may* distill his oil at too low a temperature, but this is a rare occurrence. If the oil is not pure, it is usually due to the addition of from 20 to 50, or even 75 per cent of naptha by the dealer. Such kerosene is unsafe but not explosive. The idea prevails that kerosene, like gunpowder or nitro-glycerine, is explosive, and therefore dangerous. Water will explode as readily as kerosene, and pure kerosene is as safe for burning purposes as water. But you say kerosene feeds flame! So will water, if you heat it hot enough, and bring it in contact with the right substances. The really dangerous benzine or gasoline *will not explode*, nor will their vapor explode. We must introduce air, and thoroughly mingle it with their vapor in the right proportions, before an explosive mixture is formed. This may be done in two ways:

First. When at retiring, a nearly empty lamp is extinguished, the vapor with which it has been filled cools, partially condenses, air enters to fill its place, and an explosive mixture may be formed. If lighted without refilling, an explosion may take place.

Second. When, late in the evening, the oil is nearly out of the lamp, the space above is filled with vapor. If, now, the lamp is carried into a cold room, or a cold draught strikes the lamp, the vapor condenses, air enters, and an explosion may occur. The whole danger of explosion, then, comes from air mixed vapor, and may be entirely avoided by using a large lamp and filling it every day. Most of the so-called explosions are merely bursts of flame arising from the ignition of a large surface of volatile fluid. An ordinary kerosene lamp, filled with kerosene, will be extinguish by upsetting it.

Little care will assure one of perfect safety in the use of kerosene. A simple experiment will decide as to the quality of the article in question. The United States law says that no burning fluid, whose burning point is below 110°F., shall be sold. A special act was passed by Congress, March 2d, 1867, to punish by fine and imprisonment all who should sell burning fluid below this standard, and the United States Grand Jury advised the re-enactment of this law

by our State Legislature. A lighted match should be instantly extinguished by being thrust into good oil of the legal standard. The following simple test, which may be applied by any one, furnishes information as to the safety of the fluid tested. Half fill an ordinary bowl with boiling water. Insert the bulb of a thermometer. The mercury will rise to about 200° F. Slowly pour in cold water, stirring with a thermometer till the temperature is reduced to 110 degrees (the legal standard). Now pour on the surface of the water a quantity of the fluid to be tested, and apply a match. If the fluid burns, reject it as dangerous. If a thermometer is not at hand: fill the bowl one quarter full of boiling water; add twice as much water that has been standing in the room for some time; pour on the fluid and apply the lighted match. If the fluid burns, reject it. Always use the thermometer if possible, but test the oil you buy at any rate. If you do, we will insure you against danger, from the burning fluid you use, for nothing.

In spite of the fact that insurance policies are forfeited by using or storing these dangerous fluids in any store or dwelling-house, not only are large quantities of "Danforths," "Eureka," "Safety," "Crystal," "Carbon," and "Sunlight" oils sold: but kerosene is largely adulterated with the lighter oils, and to cap the climax, gasoline is sold as a safe burning fluid. A man might more safely store a keg of gunpowder or a can of nitro-glycerine under his bed than to use the above mentioned fluids for lighting purposes. There are people who are willing to run any risk for the sake of making or saving a few dimes, but we would advise such to examine their insurance policies carefully, and see if they do not distinctly specify the fluids that may be burned. Gasoline or naptha, the basis of the secret (not patent, for they cannot get a patent on them,) oils is not specified among these, but is specified among the articles the storage or use of which forfeits the policy.

Below the point at which an oil will burn, light blue flames will run across its surface, showing that some inflammable gas is given off. The temperature at which this takes place is called the flashing point. At my request, Mr. I. W. Smith, of our State Agricultural College Laboratory, made the following tests with "Sunlight" and

"Safety" oils, and some of the materials used in manufacturing these *valuable* burning fluids:

FLUIDS.	Sp. Gravity. Water 1,000.	Flashing Point.	Burning Point.
Sunlight Oil	0.730	25° F.	37 5° F.
Safety Oil	0.683	below 0° F	below 0° F
Kerosene, used at farm house	0.800	115° F.	121° good.
Benzine	0.721	18° F.	34.5° F.
Gasoline	0.692	below 0° F	below 7° F
Alcohol	0.817	92 per cent	50° F.

It is claimed by some of the men who vend these fluids, that the low point at which the oil burns, prevents it from igniting wood, cloth, etc., and that there is no danger of fire in upsetting a lamp. In the first place, both gasoline, kerosene, and the secret burning fluids, are compounds of carbon and hydrogen, and there is just as much heat produced in the burning of carbon and hydrogen in one form as in another. But the one which burns most rapidly will produce the greatest amount of heat in the shortest space of time. The secret oil and gasoline venders claim that their fluids will burn most rapidly; therefore, out of their own mouths are they condemned, for if their fluids burn more rapidly than kerosene, they will produce more heat in a given space of time, and hence will be more dangerous. They perform the deceptive experiment of pouring gasoline, etc., upon a board, or on the floor, light it, then pouring kerosene over the same floor and lighting it. The kerosene burns the floor, while the gasoline, etc., apparently does not. But if you watch them, you will find them putting out the fire along the cracks in the floor and edges of the wall. The gasoline burns so rapidly from a smooth surface, that the heat mainly rises, but wherever rough surface or inflammable material is presented, a fire is kindled. A number of experiments, with the "Safety Oil," were tried, simulating the state of things likely to exist in a room, when a lamp was upset, and in every case the material was set on fire.

The only effective ingredients in the "Sunlight," as in most of the secret oils that I have examined, are the dangerous gasoline, naphtha, and alcohol. Potatoes, salt, soda, and the essential oils are introduced to deceive. The conclusions then are, that every person should test the oil he uses; that our legislators should, this coming

winter, as recommended by the grand jury, indorse the U. S. law; and that then the people should see to it, that no person is allowed to sell this Greek fire and liquid death, to the destruction of the ignorant and innocent. Intelligent (understanding these dangers) men may deal in these fluids. Honest men may deal in them. Can an honest *and* intelligent man deal in them? We must alarm the first, and inform the second class.

REPORT

OF THE

DEPARTMENT OF MILITARY TACTICS AND ENGINEERING.

Hon. A. S. Welch, President of Board of Trustees:

Sir:—I have the honor to submit for your information, and the consideration of the Board of Trustees, the following report of the Department of Military Tactics and Engineering for the past year.

During the first term, a class of forty-five students was instructed and drilled three times a week in the schools of the soldier and company; also a class of nineteen students received instructions in field artillery, confined mainly to the manual of the piece, the different parts and nomenclature of the same. The class in artillery was drilled with the piece one hour three times a week during the first term. Total number receiving military instruction during the first term, sixty-four.

The instruction of the second term comprised the school for the company, bayonet exercise, broad sword and small sword exercise, and field artillery. In the artillery class, the students were taught the theory and practice of pointing the piece, and instructed in the various parts of the same. Toward the end of the term, the gun detachment received instruction in target practice with fixed ammunition, nineteen shells, and six round shot, were expended in said practice, at a range of one thousand yards.

Total number of students in attendance during second term, thirty. Time expended in drill, infantry class, one hour twice a week; artillery class, one hour three times a week.

The arms and accoutrements received from the State of Iowa for the use of this department, are as follows:

40 U. S. Breech loading muskets.

40 Enfield Rifles, cal. 58, complete.

40 sets of accoutrements.
1 light 12 pounder bronze gun and limber.
1,000 rounds center fire cartridges.
96 rounds fixed ammunition for 12 pounder.
40 sets light cavalry sabres and belts.
4 non-commissioned officers swords.

There has also been received from the College, one bass and three tenor drums. The two tenor drums need reparing before they can be used.

About the middle of the second term, the company organization was discontinued, and the remaining members of the class were instructed in bayonet exercise during the rest of the term.

The State authorities impressed with the necessity of sustaining this department of the college, not only with a view to fulfilling the obligations the State is under to the Federal Government as per contract, but also from their personal knowledge of the wants of this commonwealth at the commencement of the last war, which found it totally unprepared—except in raw material—for the great emergency, have responded promptly to my requisitions for arms and ammunition in every instance and forwarded the same without expense to the college.

From time to time, as the necessities of this department required, arms and appliances have accumulated, and to-day finds us with about $3,500 worth of State and U. S. property on our hands without a safe or proper place to store a solitary article.

The subscriber, in conjunction with the President, is under bonds to the State government in the sum of $2,000 for their safe keeping and proper condition, without a single facility for so doing. A temporary shed was erected by the members of the class in artillery for the protection of the piece from the odd scraps of lumber which could be found on the farm not fit for anything else.

To keep in proper condition, and save from injury, and loss, so much valuable property, requires no small amount of attention and labor with the best facilities ; but, when such property is necessarily distributed among sixty or seventy inexperienced boys for the purposes of drill, without these facilities, it becomes a task which very few—no matter what their previous military experience may

have been—would deem it prudent to assume, apart from the risk of heavy pecuniary loss to the parties responsible for the same. In consideration of the above facts, I would respectfully recommend that the necessary steps be taken to provide an armory properly fitted up, and a gun-shed for the protection of a piece of artillery, so that the property of the State be adequately cared for.

IN REGARD TO MILITARY DISCIPLINE.

Military tactics includes discipline in its strictest military sense, and cannot be taught without it. Being very different from the discipline of the recitation room. To be successful its authority must be sustained, and its code enforced by all the power vested in the college executive. There can be no letting down, orders issued must be obeyed, and obeyed promptly. Duties prescribed must be discharged, and discharged fully. A military organization one iota below the above standard ceases to be disciplined, and degenerates to a mob. A college military organization below this standard will never be able to make that point of excellence designed by the government, and will never do honor to itself or any one connected with it. Having been identified with this department of the college from its inception, I feel deeply interested in its real progress, and if an opportunity is given me, will do my utmost to make it a success. My opinion in regard to what this organization should be, permit me to say, is based upon the experience of a life time devoted to the military profession, in view of which you will bear with me while I present the following suggestions :

All the able-bodied male students should be formed into a " College Battalion," to consist of four companies. Each company to have one captain, one first lieutenant, one orderly sergeant, and two sergeants, second and third. The non-commissioned staff to consist of one sergeant-major, and the field and commissioned staff to consist of one major, and one adjutant, with the rank of first lieutenant.

The system of self-government which has been so successfully carried out in this college, may with equal propriety be extended to this department. Let the code of discipline be the regulations for the United States army, as near as the case will admit, and the punishment for any infraction of the same to be elected by the members

of the organization. For instance: suppose a member of any company guilty of unsteadiness in the ranks, while on parade, let charges be preferred against him—in proper form, by his commanding officer. Said charges sent to the commanding officer of the battalion, who, if the charges warrant the same will call a court-martial which will try the case, convening and sitting according to regulations. Find guilty or not guilty; sentence or acquit, as the case may be. The proceedings of said court to be forwarded to the college executive—through the Professor of Military Tactics—for his approval or therwise. The punishment may be restricted to fines or extra drills during the hours of recreation.

I would further recommend that the students of the college be required to uniform themselves in accordance with an approved pattern and to remain so during their stay in the college.

In conclusion, permit me to say that in order to make this department a success, a thorough and recognized organization must be made; greater interest taken in its progress and welfare than has been heretofore evinced, and the professor in charge allowed more time to carry out its requirements.

Respectfully yours,

JAMES L. GEDDES.

REPORT ON DRAWING.

HON. A. S. WELCH.

SIR :—Although a formal report is not required from this branch of study, which is so intimately connected with the mechanic arts, I deem it highly proper, on account of its importance when viewed in connection with some of the objects for which this college was established, to lay the subject before you.

The importance of a knowledge of the art of design, as a branch of education, in its relation to the proper development of the mechanic arts, is universally admitted. The close connection existing between the artist and the mechanic, the studio and the workshop, is too evident not to be acknowledged.

In Europe, the importance of schools of design in the development of inventive powers, in directing the public taste toward a higher standard of excellence in articles of usefulness and luxury, has led to the establishment of schools of art in nearly every town. The result—as would be expected—is a higher order of taste in all the departments of mechanics and art. This, unfortunately, is not the case in our own country. Not a school of design exists under the auspices of our government, consequently our markets are flooded with articles of taste from foreign sources.

This important art should be sustained in this college with the utmost earnestness of purpose, and every facility given for its thorough development. It is not enough that a few plates are provided for copying. Casts from the antique should be procured, and plates of a superior character should be furnished for the more advanced students.

I am urged to present this subject for your consideration, more especially, from the fact that a class of sixty students, which I have instructed in free hand drawing during the past year, chiefly through

the medium of rough sketches on the black-board, will continue this study in the spring, and I have nothing to present them as a suitable object for study. I would, therefore, recommend that suitable casts, models, pictures, and plates be furnished for the use of students pursuing this branch of study.

Respectfully yours,

JAS. L. GEDDES.

REPORT OF EXECUTIVE AND BUILDING COMMITTEE.

To the Board of Trustees:

The Executive and Building Committee, elected May 4th, 1870, have according to instruction by the Board, had in their charge the general business of the Agricultural College, and the especial superintendence of certain new buildings to be erected by appropriations from the legislature. These buildings were as follows: Two wings to be added to the College, a workshop, a chemical laboratory, a horse barn, a professor's house, a corn crib and hen house, and a root cellar.

Having failed to get satisfactory bids to finish the wings by October 1st, 1870, they at once proceeded to re-advertise in several prominent newspapers for proposals to build the new wings and complete them by October first, 1871. Five bids were received in response to these advertisements, of which, that of Faucett & Bro. was found to be the lowest, and the contract was consequently given to them for the sum of thirty-nine thousand four hundred and seventy-five dollars, not including the heating apparatus.

In the fulfillment of their contract, Faucett & Bro. have proceeded with the work, until now. With the exception of a few details, the wings are completed; as the business of building them progressed it was found that some modifications were necessary, which will vary the amount for which the original contract was made.

A contract was made with Pennell & Co., to furnish heating apparatus for four thousand dollars.

A frame workshop, 30 x 50 feet, two stories high, with an engine house containing two laundry rooms 27 x 23½ feet, also two stories, with a brick smoke stack fifty feet high and necessary fixtures, was erected under direction of the committee, at a cost of five thousand dollars.

The committee also applied the appropriation granted for that purpose, to the construction of a brick building for a chemical laboratory.

This building, 30 x 60 feet, one story high, with a basement fitted up for lecture-rooms, and with convenient rooms above, was entirely finished for four thousand nine hundred and ninety-six dollars and forty cents. The walls are made thick, so that the roof may be raised for an additional story when the necessary means are provided.

The horse barn, likewise of brick, 30 x 40 feet, and provided with suitable stalls, loft, harness-room, and granary, was put up with an appropriation granted by the legislature of 1868. The construction and fitting up of a basement made the aggregate expense of one hundred and fifteen dollars and twenty-five cents more than the sum appropriated, which was two thousand five hundred dollars. This excess was paid by the transfer, made according to a law of 1868, of a part of the amount saved in the building of a hen-house and a corn crib.

The appropriation having been made in 1868 a gas-house was constructed in the rear of the College building, for five hundred dollars.

Another appropriation of four thousand five hundred dollars was applied by the committee to the construction of a professor's house.

The extension of the President's house far exceeded the estimates of the architect. His estimates given to the committee being $500, and the addition costing $1,439.14.

A corn crib and hen-house, 14 x 42 feet, 16 feet high, with basement 12 x 15 feet, has been added to the old barn and the entire barn painted. A portion of the basement of the barn has been fitted up for a root cellar, and the remainder prepared for cattle stalls—all of which cost, $565.61.

The farm house has been so changed as to enlarge the kitchen, fit up the east wing for the Secretary's office and reporting room, and to re-arrange the old office for a parlor.

A well has been dug near the rear of the horse barn, which affords a large amount of water for stock and other purposes.

The committee made an effort to supply water for the College building, the laboratory, and engine boiler, by digging a well 12 feet in diameter where it could be pumped by the windmill. After

sinking it to a depth of 30 feet, and boring it 30 feet more, they became convinced that it would not supply water in sufficient quantity for the purposes desired, and discontinued the work.

The committee have since completed a reservoir south of the laboratory for supplying water to the laboratory and engine. The committee earnestly recommend that the legislature be asked to appropriate a sum sufficient to convey water from the spring east of the farm house, and thus make provision for a permanent supply of pure water for the College.

In the spring of 1870, Superintendent Thomson, who was directed to buy two teams, purchased one span of horses, and a mare with colt by her side, at an aggegate cost of $621.25.

Under direction of the committee, a new spring wagon was bought to replace the old spring wagon which had become unsuitable for the business of the College; also, a set of new harness.

Upon an examination of the financial condition of the College, we found that there has been an excess of $19,073.77 expended upon College building for heating, lighting, supplying water, etc., and upon professors' houses, an excess of $10,791.72, over appropriations by order of a former building committee.

Work on the wings is still progressing, and we have settled with Fancett & Brother, so far as extras are concerned, by the payment of $1,500 for them.

Below will be found a statement of the expenditures of the appropriations made by the legislature at its last sesions.

J. D. WRIGHT,
O. H. P. BUCHANAN,
I. J. MITCHELL,
A. S. WELCH,
Committee.

Report of Expenditures of the Appropriations made by the Thirteenth General Assembly to the Agricultural College.

COLLEGE EXTENSION.

DR.

To appropriation	$50000 00—	$50000 00

CR.

By amount paid Faucett Bros. as per contract	$39475 00	
By amount W. A. Pennell & Co. for heating apparatus	4000 00	
By amount paid Faucett Bros. for extra labor as per contract	1700 00	
By amount paid for pipes in foul air shafts	315 30	
By amount paid for work in chapel	63 50	
By amount paid for kitchen boiler	94 72	
By amount paid for piping to water-tank	101 18	
By amount paid for removing rubbish and grading around cellar wall	277 15	
By amount paid for plans and specifications and for superintending work	1428 51	
Total amount expended	$47,455 36—	$47,455 36
Amount unexpended		$2,544 64

PROFESSOR'S HOUSE.

DR.

To appropriation	$4500 00—	$4500 00

CR.

By amount paid J. M. Linnell as per contract	$3624 00	
By amount paid for steam heating apparatus	602 15	
By amount paid for gas-pipe	19 29	
By amount paid for brick for setting boiler	33 82	
By amount paid for freight on material	66 13	
By amount paid for labor, removing rubbish, grading about cellar, &c	144 61	
By amount paid for plans and specifications, and superintending work	10 00—	$4,500 00

LABORATORY BUILDING.

DR.

To appropriation	$5000 00—	$5000 00

CR.

By amount paid for lumber	$1039 25	
By amount paid for brick	786 95	
By amount paid for stone	542 16	
By amount paid for hardware	164 89	
By amount paid for sewer tile	85 32	
By amount paid for painting material	74 98	
By amount paid for freight on material	345 08	
By amount paid for mason work as per contract	625 00	
By amount paid carpenter and joiner as per contract	625 00	
By amount paid for labor	92 66	
By amount paid for labor, mainly for excavation and foundation walls not included in contract	491 02	
By amount paid for plans, specifications and superintending	124 00	
Total amount expended	$4,996 31–	$4,996 31
Amount unexpended		$3 69

GAS HOUSE.

DR.

To appropriation	$500 00—	$500 00

CR.

By amount paid Faucett Bros. per contract	$350 00	
By amount paid for gas making apparatus	57 61	
By amount paid for lumber	12 51	
By amount paid for brick and cement	14 55	
By amount paid for freight on material	9 33	
By amount paid for work	56 00—	$500 00

WORK-SHOP BUILDING.

DR.

To appropriation	$5000 00—	$5000 00

CR.

By amount paid for lumber	$1052 78	
By amount paid for stone and cement	224 46	
By amount paid for brick and lime	175 64	
By amount paid for hardware	131 89	
By amount paid for sewer tile	38 00	
By amount paid for painting material	53 25	
By amount paid Rafft & Lindsay on excavating and cellar walls of engine-house, as per contract	275 00	
By amount paid J. W. Linnell as per contract	825 00	
By amount paid for freight on material	560 05	
By amount paid for labor	1077 77	
By amount paid for material setting engine	463 26	
By amount paid plans, specifications and superintending	120 00	
Total amount expended	$4,997 10—	$4,997 10
Amount unexpended		$2 90

FARM TILE DRAIN.

DR.

To appropriation	$1000 00—	$1000 00

CR.

By amount paid for tiles	$163 00	
By amount paid for freight	198 00	
By amount paid Wood & Austin as per contract	255 00	
By amount paid for labor	366 65	
Total amount expended	$982 65—	$982 65
Amount unexpended		$22 35

FARM IMPROVEMENT.

DR.

To appropriation	$2000 00—	$2000 00

CR.

By amount paid for labor	$359 89	
By amount paid for hardware	135 81	
By amount paid for grass and rye seed	140 25	
By amount paid for brick, lime, and mortar	23 65	
By amount paid for barn well	186 57	
By amount paid for labor	1179 16	
Total amount expended	$2,025 33—	$2,025 33
Amount above appropriation	$25 33	

SEED AND PLANT.

DR.

To appropriation	$500 00—	$500 00

CR.

By amount paid for seeds	$44 15	
By amount paid for freight	1 60	
Total amount expended	$45 75	
Amount unexpended		$454 25

REPORT OF LAND AGENT.

To the Board of Trustees of the Iowa Agricultural College:

The following report of the transactions of the land department of the College for the years 1870 and 1871, is hereby submitted for your consideration.

During the year 1870, interest has been collected and paid over to the Treasurer as follows:

March 31, first quarter, ending March 31, 1870		$ 7426 34
Jan. 30, second quarter, ending June 30, 1870		7241 44
Sept. 30, third quarter, ending Sept. 30, 1870		8672 89
Dec. 31, fourth quarter, ending Dec. 31, 1870		6431 75
March 31, paid Treasurer, voucher No. 25	$ 7426 34	
Jan. 30, paid Treasurer, voucher No. 26	7241 44	
Sept. 30, paid Treasurer, voucher No. 27	8672 89	
Dec. 31, paid Treasurer, voucher No. 28	6431 75	
Amount collected and paid over in 1870	$29772 42	$29772 42

During the year 1871, interest was collected and paid over as follows:

March 31, first quarter, ending March 31, 1871		$ 8729 87
June 30, second quarter, ending June 30, 1871		6568 61
Sept. 30, third quarter, ending Sept. 30, 1871		9277 50
Dec. 30, fourth quarter, ending Dec. 30, 1871		7193 37
March 31, paid Treasurer voucher No. 29	$ 8729 89	
June 30, paid Treasurer, voucher No. 30	6768 61	
Sept. 30, paid Treasurer, voucher No. 31	9277 50	
Dec. 30, paid Treasurer, voucher No. 32	7193 37	
Amount collected and paid over in 1871	$31969 35	$31969 35

The following endowment fund was collected and paid over during the years 1870 and 1871:

March 31, endowment fund received first quarter, 1870		$ 480 00
June 30, endowment fund received second quarter, 1870		2367 27
December 31, endowment fund received fourth quarter, 1870		480 00
March 31, endowment fund received first quarter, 1871		749 92
		$4437 19
March 31, 1870, remitted to Treasurer, voucher No. 4		$ 480 00
June 30, 1870, remitted to Treasurer, voucher No. 5		2367 27
January 2, 1871, remitted to Treasurer, voucher No. 6		480 00
April 6, 1871, remitted to Treasurer, voucher No. 7		360 00
December 30, 1871, remitted to Treasurer, vouchers Nos. 8 and 9		360 00
December 30, endowment fund received fourth quarter, 1871		749 92
Amount collected and paid over in 1870 and 1871		$4437 19

Number of acres of forfeited land not disposed of at date of last annual report, December 31, 1870		14818 68
Number of acres forfeited since last annual report,	6248 33	
		21067 01
Number leased since last annual report	1520 00	
Number not leased, (forfeited lands,)	19547 01	
		21067 01

The action brought to test the rights of lessees in lands forfeited for non-payment of interest, and to determine whether foreclosure was necessary, has been decided by the Supreme Court of the State, the delinquents, in the opinion of the court, having forfeited

all rights and interest in the land, no action to foreclose their equities is necessary.

The forfeited lands having been withdrawn at the December meeting, 1870, and re-appraised by a special committee, were restored to market in May, 1871, at an advanced price ranging from $3 50 to $6.00 per acre.

Owing to the advance in price and the limited term for which leases are now issued, all contracts being made to terminate on or before Dec. 31, 1875, but few tracts have been leased since the re-appraisement of the land.

The Board having ordered a stricter enforcement of forfeitures, circulars were issued to lessees so far as their address could be ascertained, and the interest is now being paid with unusual promptness, there being but few delinquents.

The attention of the Board has been frequently called to the subject of the taxation of the College lands while held under leases.

In compliance with your instructions a case was brought in the District Court of Webster county to test the question, and was decided at the last term, the court holding that the lands are not liable to taxation during the term of the lease and that all taxes levied on lands so held are illegal.

The case has been appealed to the Supreme Court and will probably be brought to a hearing at this December Term, and the decision of the District Court affirmed.

In compliance with the instructions of the Board of Trustees, quarterly reports, giving detailed statements of all the transactions of this office, have been regularly made to the Secretary. These reports are full copies of the books kept in my office, and contain statements of interest received, name of payor, date and amount of payment, and number of lease upon which payment is made; also, tabular statement of lands leased, showing number of lease, description of tract, price per acre, name of lessee, date of lease, and amount of payment; also, statement of lands forfeited during the quarter. These reports are filed in the office of the Secretary and are open to the inspection of the officers of the College and the public. All of which is respectfully submitted.

GEO. W. BASSETT.

The following is a tabular statement of all lands leased since December 31, 1869, the date of the last biennial report.

Respectfully submitted,

GEO. W. BASSETT, Agent.

Number of lease.	Part of Section.	Number of Section.	Township.	Range.	Number of Acres.	Total Valuation.	Name of Lessee.	Date of Lease.	Amount Received.	Entrance Fee.
								1870.		
1288	e..	28	98	29	160	$ 360 00	J. H. Todd, and W. M. Clagg	Jan. 17.	$ 57 60	$14
1289	se..	23	97	27	160	424 00	Peter Doyle	"...	67 84	14
1290	ne .	26	97	27	160	424 00	J. H. Houston	"...	67 84	14
1291	se..	26	97	27	160	424 00	Samuel Cooper	"...	67 84	14
1292	ne .	35	97	27	160	424 00	Isaac Dilley	"...	67 84	14
1293	se..	35	97	27	160	424 00	P. Gilmartin	"...	67 84	14
1294	nw.	25	97	27	160	424 00	John Ackerly	"...	67 84	14
1295	ne .	25	97	27	160	424 00	A. D. Phillips	"...	67 84	14
1296	se ¼	25	97	27	160	424 00	Spencer Fornham	"...	67 84	14
1297	sw .	25	97	27	160	424 00	L. Quinn	"...	67 84	14
1298	nw.	36	97	27	160	424 00	Ira Bisbie	"...	67 84	14
1299	ne .	36	97	27	160	424 00	James Lawler	"...	67 84	14
1300	se ¼	36	97	27	160	424 00	James Lawler	"...	67 84	14
1301	nw.	32	90	32	160	696 00	J. Carstens	Jan. 24.	111 36	14
1302	ne .	34	98	28	160	432 00	D. E. Flint	Feb 14.	69 12	14
1303	nw.	34	98	28	160	432 00	M. R. Flint	"...	69 12	14
1304	nw.	15	96	30	160	408 00	M J. Booth	March 8.	65 28	14
1305	se	35	97	30	160	360 00	J. R. Smith	April 18	57 60	14
1306	sw.	35	97	30	160	360 00	Elvira Smith	"...	57 60	14
1307	se.	32	96	31	160	416 00	R. H. Moss	"...	66 56	14
1308	ne .	32	96	31	160	416 00	P. S. Dorsay	"...	66 56	14
1309	sw .	21	97	30	160	416 00	Albert Dorsay	"...	66 56	14
1310	ne	18	96	31	160	416 00	J. C. Huss	"...	66 56	14
1311	se..	18	96	31	160	416 00	C. V. Burk	"...	66 56	14
1312	se..	28	96	36	160	416 00	Alva Burk	"...	66 56	14
1313	ne .	27	96	36	160	416 00	C. Burk	"...	66 56	14
1314	sw.	23	96	36	160	416 00	John Norton	"...	66 56	14
1315	nw	27	96	35	160	416 00	Calvin Norton	"...	66 56	14
1316	sw .	23	94	28	160	420 00	E H Norton	April 27.	67 20	14
1317	ne .	10	94	28	160	600 00	K. C. Norton	"...	96 00	14
1318	se..	15	97	30	160	432 00	Andrew Paddock	"...	69 12	14
1319	sw .	15	97	30	160	416 00	J. A. Arnold	Apr. 27	66 56	14
1320	nw.	4	94	32	147.60	391 14	G W. Gifford	"...	62 58	14
1321	ne .	4	94	32	148.38	393 20	Mary Gifford	"...	62 90	14
1322	ne .	2	94	32	148.65	379 05	Chas. Couch	"...	60 64	14
1423	nw.	2	94	32	148.21	392 75	Peter Couch	"...	62 84	14
1324	se..	8	96	31	160	424 00	J. R. Snow	"...	67 84	14
1325	se..	17	96	31	160	424 00	A. C. Snow	"...	67 84	14
1326	se..	14	90	37	160	672 00	Thos. Sargent	May 10	107 52	14

REPORT OF LAND AGENT—CONTINUED.

Number of Lease.	Parts of Sections.	Number of Section.	Township.	Range.	Number of Acres.	Total Valuation.	Name of Lessee.	Date of Lease.	Amount Received.	Entrance Fee.
1327	ne .	14	94	38	160	$ 584 00	E. C. Smith	May 16	$ 93 44	$14
1328	nw.	14	94	28	160	584 00	Wm. Curry	"	93 44	14
1229	ne .	13	94	28	160	496 00	A. Pliny	"	79 36	14
1330	ne .	36	95	31	160	400 00	G. Dean	"	64 00	14
1331	nw.	36	95	31	190	400 00	S. R. Leonard	"	64 00	14
1332	sw .	32	97	30	160	408 00	C. Remson	"	65 28	14
1333	se..	21	97	30	160	408 00	S A. Gillard	"	65 28	14
1334	se..	20	95	27	160	552 00	Geo. P. Gillard	"	88 32	14
1335	sw .	20	95	27	160	552 00	P. Levering	"	88 32	14
1336	nw.	20	98	30	160	424 00	H. Kuston	"	67 84	14
1337	ne .	20	98	30	160	424 00	L. M. Pearce	"	67 84	14
1338	se..	18	96	33	160	432 00	W. Cleveland	May 21	69 12	14
1339	ne .	18	96	33	160	432 00	G. Cleveland	"	69 12	14
1340	sw .	20	90	32	160	704 00	Samuel Smith	May 26	112 64	14
1341	ne .	12	96	34	160	416 00	H. Waterhouse	May 27	66 56	14
1342	sw .	26	90	32	160	712 00	D. Hoeffling	June 4	113 92	14
1343	ne .	21	95	27	160	576 00	W. C. Putman	June 10	92 16	14
1344	ne .	1	96	32	148.24	385 42	Chas. Cartlin	"	61 66	14
1245	nw.	1	96	32	145.56	378 45	A. M. Cartlin	"	60 56	14
1346	se..	1	96	32	160	416 00	R. Wilder	"	66 56	14
1347	sw .	1	96	32	160	416 00	A. P. Wilder	"	66 56	14
1348	ne .	34	97	32	160	416 00	A. Levering	"	66 56	14
1349	nw.	34	97	32	160	416 00	A. Wilston	"	66 56	14
1350	se .	34	97	32	160	416 00	Chas. Wilston	"	66 56	14
1351	sw .	34	97	32	160	416 00	E. Roy	June 10	66.56	14
1352	nw.	24	94	32	160	432 00	C. Roy	"	69.12	14
1353	sw .	14	96	36	160	432 00	A. A. Call	June 16	69.12	14
1354	sw .	27	96	36	160	440 00	C. C. Washburne	"	70.40	14
1355	se ..	27	96	36	160	440 00	Nancy E. Call	"	70.40	14
1356	ne .	12	95	36	160	432 00	Allen D. Grove	"	69.12	14
1357	nw.	24	98	29	160	488 00	E. E. Washburne	"	78.08	14
1358	sw .	10	96	36	160	432 00	Mary E. Neckart	"	69.12	14
1359	nw.	10	96	36	160	432 00	Asa F. Call	"	69.12	14
1360	sw .	3	96	36	160	432 00	J. H. Call	"	69.12	14
1361	nw.	1	95	36	175.56	474 00	Geo. C. Call	"	75.84	14
1362	sw .	1	95	36	160	432 00	A. M. Neckart	"	69.12	14
1363	ne .	36	85	29	160	432 00	John Hill	June 22	69.12	14
1364	nw.	36	85	29	160	432 00	L. L. Merrill	"	69.12	14
1365	ne .	33	95	30	160	392 00	C. M. Pickett	July 1	31.36	14
1366	se ..	33	95	30	160	392 00	E. W. Pickett	"	31.36	14
1367	sw .	33	95	30	160	392 00	John Metcalf	"	62.72	14
1368	nw.	28	95	30	160	392 00	Mahala Metcalf	"	62.72	14
1369	se ..	28	95	30	160	392 00	H. Venson	"	31.36	14
1370	nw.	34	97	30	160	416 00	Edwin Williams	"	66.56	14
1371	sw .	36	97	34	160	424 00	Calvin S. Warren	July 5	67.84	14
1372	se¼	34	98	27	160	424 00	Z. McMahony	"	67.84	14
1373	se .	27	99	31	160	424 00	E. G. Smith	"	67.84	14
1374	nw.	32	99	30	160	424 00	W. H. Raymond	"	67.84	14
1375	ne .	10	98	27	160	424 00	Wm. Robertson	"	33 92	14
1376	nw.	11	98	27	160	416 00	C. L. Thomson	"	33.28	14

REPORT OF LAND AGENT—CONTINUED.

Number of Lease.	Parts of Sections.	Number of Section.	Township.	Range.	Number of Acres.	Total Valuation.	Name of Lessee.	Date of Lease.	Amount Received.	Entrance Fee.,
1377	ne .	25	98	28	160	$ 416 00	Wm. Stanley	July 5	$ 66.56	$14
1378	ne .	36	90	32	160	696 00	M. M. Whiteford	"	55.68	14
1379	se ..	36	90	32	160	696 00	D. G Roderick	"	55.68	14
1380	nw.	24	100	36	160	392 00	E. N. Cowan	"	62 72	14
1381	se ..	36	98	28	160	416 00	E. F. Riley	"	66.56	14
1382	sw .	36	98	28	160	416 00	Chas. P. Riley	"	66 56	14
1383	nw.	25	98	28	160	416 00	F. Z. Rossiter	July 5	66 56	14
1384	sw .	25	98	28	160	146 00	Call. Rossiter	"	66 56	14
1385	sw .	12	100	36	160	292 00	A. D. Thomas	"	62 72	14
1336	nw.	13	100	36	160	392 00	P. R. Sanford	"	62 72	14
1387	nw.	4	94	36	140.61	464 00	James A. Paxton	"	74 24	14
1388	sw .	4	94	36	160	528 00	U. M. Scott	"	84 48	14
1389	nw.	3	94	36	141.03	465 40	Jesse Hauser	"	37 23	14
1390	sw .	3	94	36	160	529 09	F. M. Coons	"	42 24	14
1391	ne .	3	94	36	141.35	466 45	O. M. Gregg	"	37 31	14
1392	se..	3	94	36	160	528 00	H. R. Tinstey	"	42 24	14
1393	ne .	18	98	29	160	392 00	Ben. G. Riley	"	62 72	14
1394	se .	18	98	29	160	392 00	Anna F. Riley	"	62 72	14
1395	nw.	12	98	31	160	392 00	Henry Campbell	"	31 56	14
1396	se..	12	98	31	160	392 00	N. S. Joslin	"	62 72	14
1397	nw.	8	88	41	160	408 00	John S. Brown	"	32 64	14
1398	ne .	8	88	41	160	408 00	F. W. Iddings	"	65 28	14
1399	sw .	8	88	41	160	408 00	R. M. Braden	"	65 28	14
1400	ne .	14	88	41	160	408 00	A. A. Jennison	"	65 28	14
1401	sw .	14	88	41	160	408 00	John B. Robb	"	65 28	14
1402	se.	4	88	41	160	408 00	Geo. W. Coon	"	32 64	14
1403	sw .	14	88	41	160	408 00	Edward Nicholls	"	65 28	14
1404	se..	14	88	41	160	408 00	H. W. Clugstone	"	65 28	14
1405	se..	12	88	41	160	408 00	E. B. Wait	"	65 28	14
1406	sw .	12	88	41	160	424 00	H. C. Bradley	"	67 84	14
1407	ne .	26	88	41	160	680 00	E. B. Metar	"	108 86	14
1408	sw .	26	88	41	160	680 00	James A. Collins	"	108 80	14
1409	nw.	28	87	41	160	648 00	E. Goldspohn	"	103 68	14
1410	ne .	30	100	34	160	424 00	J. A. Elliott	July 23	67 84	14
1411	sw .	26	90	24	160	720 00	Robert P. S. aulding	July 5.	115 26	14
1412	se..	25	90	24	160	720 00	H. R Eaton	"	115 20	14
1413	sw .	14	96	27	160	448 00	George E. Clark	July 27.	71 68	14
1414	nw.	25	95	21	160	600 00	Lucy E. Clark	"	96 00	14
1415	se ..	20	95	33	160	424 00	Maria W. Williams	Aug. 1	67 84	14
1416	ne .	8	97	32	160	392 00	Jas. P. White	" 30	62 72	14
1417	ne .	18	97	33	160	408 00	Wm. K. Mulroney	" 31	65 28	14
1418	nw.	8	94	32	160	424 00	Wm. H. Shed	" 31	67 84	14
1419	sw .	27	99	31	160	416 00	J. L. D. Morrison	Sept. 6	33 25	14
1420	ne .	9	98	29	160	424 00	S. B. Chandler	" 13	33 92	14
1421	nw.	9	98	29	160	424 00	Jas. M. Hughes	" 13	33 92	14
1422	sw .	20	95	33	160	424 00	E. J. Hartshorn	" 13	67 84	14
1423	ne .	17	98	36	160	440 00	F. M. Taylor	Oct. 1	70 40	14
1424	sw .	17	98	36	160	440 00	Mary Taylor	"	70 40	14
1425	ne .	6	84	30	190.99	276 93	E. C. Baffum	"	22 15	14
1426	nw.	11	96	30	160	400 00	Mary J. Clark	"	64 00	14

REPORT OF LAND AGENT—CONTINUED.

Number of Lease.	Parts of Sections.	Number of Section.	Township.	Range.	Number of Acres.	Total Valuation.	Name of Lessee.	Date of Lease.	Amount Received.	Entrance Fee.
1427	ne .	36	97	34	160	$ 424 00	Thos. White	Oct. 1	$ 67 84	$14
1428	ne .	34	90	24	160	736 00	J. A. Carpenter	"	117 76	14
1429	nw.	34	90	24	160	736 00	I. M. Carpenter	"	117 76	14
1430	se ..	34	90	24	160	736 00	E. E. Carpenter	"	117 76	14
1431	sw..	34	90	24	160	720 00	Ella Carpenter	"	115 20	14
1432	nw.	26	90	24	160	736 00	L. B. Clark	"	117 76	14
1433	ne .	26	90	24	160	736 00	Lydia J. Clark	"	117 76	14
1434	ne .	34	100	34	160	440 00	H. L. Leggett	"	70 40	14
1435	ne .	4	98	34	153.31	390 95	Mrs. F. Leggett	"	31 27	14
1436	se ..	12	96	34	160	432 00	Benj. Peaslee	"	34 56	14
1437	se. .	20	98	30	160	432 00	John Seippert	"	34 56	14
1438	sw..	4	98	29	160	400 00	Jacob Keeser	"	32 00	14
1439	se ..	4	98	29	160	400 00	John P. Adams	"	32 00	14
1440	sw..	3	98	29	160	400 00	A. Geoffrey	"	32 00	14
1441	se ..	20	90	31	160	600 00	H. Stuckelboy	" 12	96 00	14
1442	sw..	34	98	30	160	392 00	Z. Boyd	" 27	31 36	14
1443	ne .	4	94	36	140.79	478 69	Evan Jeffreys	" 31	38 30	14
1444	se ..	4	94	36	160	544 00	Jas. Jeffreys	" 31	43 52	14
1445	ne .	26	98	34	160	448 00	Wm. Gemons	Nov. 11	71 68	14
1446	sw..	24	98	34	160	448 00	Nancy Gemons	"	71 86	14
1447	nw.	4	98	34	152.33	403 67	Caroline Jeffreys	"	64 60	14

LIST OF LANDS LEASED DURING THE YEAR 1871.

1448	ne .	34	95	33	160	$ 880 00	E. J. Hartshorn	July 1	$ 70 40	$14
1449	sw.	32	90	31	160	600 00	Jas. S. Lewis	" 1	48 00	14
1450	se. .	18	97	32	160	880 00	D. D. Shields	" 24	70 40	14
1451	nw .	28	97	33	160	880 00	Daniel Shea	" 24	70 40	14
1452	se ..	1	98	27	160	560 00	Geo. F. Savitz	" 31	44 80	14
1453	ne .	12	98	27	160	560 00	R. H. Pabst	" 31	44 80	14
1454	se .	12	98	27	160	560 00	Charles H. Pabst	" 31	44 80	14
1455	s hf se q.	18	87	40	80	400 00	Jos. Ferguson	Aug. 12	32 00	14
1456	sw..	2	98	27	160	560 00	Samuel Gillham	Sept. 6	44 80	14
1457	se . .	6	98	27	160	560 00	Samuel C. Gillham	"	44 80	14

REPORT OF T. J. STONE.

The following described lands were purchased with interest accrued before the opening of the College :

List of lands leased by Thos. J. Stone, Agent for Iowa Agricultural College, from August 3d, 1869 to 1st day of December, 1871.

Date.	Parts of Sec.	Section.	Township.	Range.	Acres.	Name of Lessee.	Appraised value.	Eight per cent received
1870.								
Feb. 24	sw qr	24	93	36	160	Isaac Garmoe	$ 2 50	$ 32 00
"	se qr	24	93	36	160	N. M. Page	2 50	32 00
Feb. 17	ne qr	36	93	36	160	Christian Peterson	2 50	32 00
"	se qr	36	93	36	160	Andrew Peterson	2 50	32 00
Feb. 4	sw qr	36	93	36	160	Edwin H. Edwards	2 50	32 00
"	nw qr	36	93	36	160	Pierpont Edwards	2 50	16 00
Dec. 23	w hf nw qr	34	93	36	80	W. H. Buckwalter	2 50	32 00
Feb. 17	se qr	32	93	36	160	H. M. Thompson	2 50	32 00
"	ne qr	32	93	36	160	A. W. Brownlee	2 50	32 00
Nov. 3	sw qr	28	93	36	160	Geo. Murphy	2 50	32 00
1871.								
May 6	se qr of ne qr and lots 1 and 2	7	97	48	137.66	J. F. Herwig	2 50	27 53
May 6	ne qr of s w qr and lots 3 and 4 and lot 3.	7 18	97	48	149.50	Isabel Herwig	2 50	29 90
May 6	lots 1 & 2 and 1 & 2	17 18	97	48	166.01	J. K. Herwig	2 59	33 44
1870.								
April 6	ne qr	14	100	45	160	Hudson Burr	2 00	25 60
"	nw qr	14	100	45	160	Simon Burr	2 00	25 60
"	se qr	14	100	45	160	Alonzo Burr	2 00	25 60
"	sw qr	14	100	45	160	Norval Dixon	2 00	25 60
"	ne qr	15	100	45	160	E. H. Rood	2 00	25 60
"	nw qr	15	100	45	160	Charles Lamp	2 00	25 60
April 6	se qr	15	100	45	160	Reuben L. Davis	2 00	25 60
"	sw qr	15	100	45	160	Elizabeth Boyd	2 00	25 60
"	ne qr	22	100	45	160	Ellen A. Rood	2 00	25 60
"	se qr	22	100	45	160	Harvey L. Rood	2 00	25 60
"	ne qr	27	100	45	160	Major W. Packard	2 00	25 60
"	se qr	27	100	45	160	William E. Hughes	2 00	25 60
Jan. 26	se qr	12	99	45	160	Solomon T. Osborne	2 00	25 60
"	sw qr	12	99	45	160	Harriett N. Osborne	2 00	25 60

REPORT OF LAND AGENT—CONTINUED.

Date.	Parts of Sec.	Section.	Township.	Range.	Acres.	Name of Lessee.	Appraised Value.	Eight per cent received.
..."...	ne qr.....	12	99	45	160	Joseph Tangye.....	2 00	25 60
..."...	nw qr.....	12	99	45	160	Elizabeth Tangye.....	2 00	25 60
Feb. 23	ne qr.....	24	99	45	160	Josiah Osborne.....	2 00	25 60
..."...	nw qr.....	24	99	45	160	Louisa Osborne	2 00	25 60
..."...	se qr	24	99	45	160	J. S. Daniels	2 00	25 60
..."...	sw qr.....	24	99	45	160	Geo. P. Moore.....	2 00	25 60
Mar. 21	ne qr	19	98	47	160	Absalom Skewis.....	2 00	25 60
..."...	se qr.....	19	98	47	160	Bennett T. Osborne.....	2 00	25 60
..."...	nw qr.....	20	99	47	160	James Skewis.....	2 00	25 60
..."...	sw qr. ...	20	98	47	160	William Oates	2 00	25 60
Dec. 23	nw qr.....	29	98	47	160	J. A. Carpenter and L. B Clark	2 00	25 60
Jan. 26	sw qr.....	29	98	47	160	Abisha Baker.....	2 00	25 60
Dec. 23	ne qr.. ...	19	100	48	160	Samuel A. Ayres.....	2 00	25 60
..."...	se qr.....	19	100	48	160	Wm. Christy.....	2 00	25 60
1871.								
June 20	nw qr.....	20	100	48	160	John Little.....	2 00	25 60
..."...	ne qr.....	20	100	48	160	Edward Bennett.....	2 00	25 60
..."...	se qr.....	20	100	48	160	Jeanette Little	2 00	25 60
1871.								
June 20.	sw qr.....	20	100	48	160	Eleanor Bement.....	2 00	25 60
1870.								
Aug. 18.	ne qr.....	32	100	48	160	G. W. Fife.....	2 00	25 60
..."...	nw qr.....	32	100	48	160	Chas. A. Fife.....	2 00	25 60
..."...	se qr.....	32	100	48	160	Wm. J. Fife.....	2 00	25 60
..."...	sw qr.....	32	100	48	160	W. A. Fife.....	2 00	25 60
July 18	nw qr.....	17	99	47	160	Geo. Osgood.....	2 00	25 60
..."...	sw qr.....	17	99	47	160	M. J. Elliott.	2 00	25 60
..."...	ne qr.....	18	99	47	160	James Calman.....	2 00	25 60
..."...	se qr.....	18	99	47	160	Sam'l E. Rankin.....	2 00	25 60
July 26.	ne qr.....	17	99	47	160	L. E. Darling.....	2 00	25 60
..."...	se qr.....	17	99	47	160	A. H. Morse.....	2 00	25 60
May 31.	se qr.....	30	91	43	160	Andrew J. Graves.....	2 00	25 60
..."...	ne qr.. ...	30	91	43	160	Charles S. Pierce.....	2 00	25 60
July 18.	se qr.....	2	99	38	160	B. F. Allen.....	2 00	25 60
Feb. 18.	ne qr.....	24	100	38	160	David Kern.....	2 00	25 60
..."...	nw qr.....	24	100	38	160	Hattie E. Kern.....	2 00	25 60
..."...	se qr.....	24	100	38	160	Harry C. Demott.....	2 00	25 60
..."...	sw qr.....	24	100	38	160	Jas. Beath.....	2 00	25 60
May 24.	ne qr.....	34	100	38	160	J. C. Cusey.	2 00	25 60
..."...	se qr.....	34	100	38	160	Mary Cusey.....	2 00	25 60
Feb. 17.	nw qr.....	36	90	41	160	G. W. Jones.....	2 25	28 80
..."...	ne qr.....	36	90	41	160	M. J. Menhennet.....	2 25	28 80
. ."...	se qr.....	36	90	41	160	W. Menhennet.....	2 25	28 80

THE FOLLOWING HAVE BEEN SOLD AND PATENTED.

Nov. 14, 1870, Elizabeth T. Brownlie, paid $320, in full for ne qr, 30, 98, 47.

Nov. 14, 1870, Wm. T. Brownlie, paid $320, in full for se qr, 30, 98, 47.

THOS. J. STONE, *Agent.*

REPORT FOR 1871.

OFFICE OF TREASURER OF BOARD OF TRUSTEES,
OF IOWA AGRICULTURAL COLLEGE AND FARM,
DES MOINES, IOWA, Dec. 7, 1871.

To the Honorable Board of Trustees of the Iowa State Agricultural College and Farm:

GENTLEMEN: I have the honor to submit the following biennial report of the financial transactions of the office during the fiscal term commencing January 11, 1870, and closing November 30, 1871, prepared in accordance with your instructions, from my annual repo for 1870 and 1871, showing briefly the receipts and disbursements during that period, and the balance now in the treasury belonging to the different funds. In preparing this report I have been as brief as was consistent with a full showing of the several funds. In the endowment interest fund account I have, as in my last biennial report, made no entry of the purchase or sale of bonds belonging to that fund, as such bonds were purchased or sold at par, and such entry would not change the value, but only the character of the amount on hand.

The time of the annual meeting of the Board of Trustees, having been changed by the Legislature at its last session, from the second Monday of January to the first Wednesday of December in each year, it becomes necessary to make up this report before the payment of the January interest on moneys invested and lands leased. And hence the receipts are not so great, nor the showing so favorable as if the report covered the entire period of two years.

All of which is most respectfully submitted.

SAMUEL E. RANKIN,

Treasurer Board of Trustees of Iowa State Agricultural College and Farm.

SAMUEL E. RANKIN, *in account with Iowa Agricultural College "Building Fund," from January* 11, 1870, *to November* 30, 1871, *inclusive.*

1870.	DR.		
May 27.	To appropriation by 13th General Assembly	$ 50000 00	
1871.			
Nov. 30.	To amount transferred from End. Int. Fund, being am't of Col. Build. Fund expended prior to date of last report, and chargeable to End. Int. Fund	687 25	
Nov. 30.	To amount transferred from Contingent Fund, being am't expended for exchange and expressage	24 99	$ 50712 24
1870.	CR.		
Jan. 11.	By amount overdrawn as per last report	687 25	
June 23.	By amount paid Messrs. Wright & Buchanan	136 60	
July 21.	By amount paid Geo. W. Jones, cashier	1000 00	
Aug. 4.	By amount paid Geo. W. Jones, cashier	2000 00	
Aug. 23.	By amount paid Geo. W. Jones, cashier	5500 00	
Sept. 8.	By amount paid Geo. W. Jones, cashier, and exchange on same	5001 25	
Oct. 5.	By amount paid Geo. W. Jones, cashier	3000 00	
Nov. 25.	By amount paid Geo. W. Jones, cashier, and exchange on same	3002 50	

Dec. 10.	By amount paid Geo. W. Jones, cashier, and exchange on same	$ 1501 25	
1871.			
Jan. 2.	By amount paid Geo. W. Jones, cashier, and exchange on same	1001 25	
Jan. 25.	By amount paid Geo. W. Jones, cashier	500 00	
Feb. 25.	By amount paid Geo. W. Jones, cashier, and exchange on same	1000 62	
May 4.	By amount paid Geo. W. Jones, cashier, and exchange on same	2503 12	
May 15.	By amount paid Geo. W. Jones, cashier	2000 00	
June 5.	By amount paid Geo. W. Jones, cashier, and exchange on same	2501 88	
June 10.	By amount paid Geo. W. Jones, cashier, and exchange on same	2500 62	
Aug. 4.	By amount paid Geo. W. Jones, cashier, and exchange on same	2503 13	
Sept. 5.	By amount paid Geo. W. Jones, cashier, and exchange on same	4002 50	
Oct. 4.	By amount paid Geo. W. Jones, cashier	2500 00	
Nov. 11.	By amount paid Geo. W. Jones, cashier, and exchange on same	2500 63	
Nov. 23.	By amount paid Geo. W. Jones, cashier	2825 00	$ 48167 60
	Balance in treasury		$ 2544 64

SAMUEL E. RANKIN, *in account with Iowa Agricultural College "Farm Fund," from January* 11, 1870, *to November* 30, 1871, *inclusive.*

1870.		DR.		
Jan. 11.	To balance in Treasury as per last report	$ 673 07		
Feb. 8.	To amount received from Hon. J. D. Wright	82 50		
1871.				
Nov. 1.	To amount transferred from Contingent Fund	8 00—	$	763 57
1870.		CR.		
Feb. 18.	By amount paid Geo. W. Jones, cashier	755 57		
1871.				
Oct. 20.	By amount paid Dr. Thos. Holyoke, per G. W. J	8 00—		763 57

SAMUEL E. RANKIN, *in account with the Iowa Agricultural College "Farm Improvement Fund," from January* 11, 1870, *to November* 30, 1871, *inclusive.*

1870.		DR.		
May 27.	To appropriation by 13th General Assembly	$ 2000 00		
1871.				
Nov. 1.	To amount transferred from Contingent Fund	1 25—	$	2001 25
1870.		CR.		
Sept. 8.	By amount paid Geo. W. Jones, cashier	1000 00		
1871.				
Mar. 11.	By amount paid Geo. W. Jones, cashier, and exch'g. on same	1001 25—		2001 25

SAMUEL E. RANKIN, *in account with Iowa Agricultural College "Workshop Building Fund," from January* 11, 1870, *to November* 30, 1871, *inclusive.*

1870.		DR.		
May 27.	To appropriation by 13th General Assembly	$ 5000 00		
1871.				
Nov. 1.	To amount transferred from Contingent Fund	3 13—	$	5003 13
1870.		CR.		
May 27.	By amount paid Geo. W. Jones, cashier, and exch'g on same,	2501 25		
June 7.	By amount paid Geo. W. Jones, cashier, and exch'g on same,	2501 88—		5003 13

SAMUEL E. RANKIN, *in Account with the Iowa Agricultural College "Laboratory Building Fund, from Jan.* 11, 1870, *to Nov.* 30, 1871, *inclusive.*

1870.		DR		
May 27.	To appropriation by 13th General Assembly	$ 5000 00		
1871.				
Nov. 1.	To amount transferred from Contingent Fund	3 75—	$	5003 75
1870.		CR.		
Sept. 2.	By amount paid George W. Jones, cashier, and exchange on same	$ 2501 87		
Sept. 22.	By amount paid Geo. W. Jones, cashier, and exchange on same	2501 88—		5003 75

SAMUEL E. RANKIN, *in Account with the Iowa Agricultural College "Fund for Building Granary, Stable, and Tool-House, from Jan. 11, 1870, to Nov. 30. 1871, inclusive.*

1870.		DR.		
Jan. 11.	To balance in treasury, as per last report	$	2000 00	
1871.				
Nov. 1.	To amount transferred from Contingent Fund		2 50—	$ 2002 50
1870.		CR.		
July 6.	By amount paid Geo. W. Jones, cashier, and exchange on same		2002 50—	$ 2002 50

SAMUEL E. RANKIN, *in Account with the Iowa Agricultural College "Fund for Building Hog-House, Hen-House, and Corn Crib, from Jan. 11, 1870, to Nov. 30, 1871, inclusive.*

1870.		DR.		
Jan. 11.	To balance in treasury, as per last report	$	800 00—	$ 800 00
1870.		CR.		
Nov. 2.	By amount paid Geo. W. Jones, cashier		800 00—	800 00

SAMUEL E. RANKIN, *in Account with the Iowa Agricultural College "Fund for Tile Draining Farm," from Jan. 11, 1870, to Nov. 30, 1871, inclusive.*

1870.		DR.		
May 27.	To appropriation by 13th General Assembly		$1000 00—	$1000 00

1870.		CR.		
Sept. 8.	By amount paid Geo. W. Jones, cashier		$500 00	
Nov. 2.	By amount paid Geo. W. Jones, cashier		500 00—	$1000 00

SAMUEL E. RANKIN, *in Account with the Iowa Agricultural College "Fund for Erecting Professors' Houses," from Jan. 11, 1870, to Nov 30, 1871, inclusive.*

1870.		DR.		
May 27.	To appropriation by 13th General Assembly		$4500 00	
1871.				
Nov. 1.	To amount transferred from Contingent Fund		9 37—	$4509 37
1870.		CR.		
Jan. 11.	By amount overdrawn as per last report	$	5 62	
Nov. 9.	By amount paid Geo. W. Jones, cashier, with exchange		3001 87	
1871.				
Sept. 5.	By amount paid Geo. W. Jones, cashier, with exchange		1501 88—	$ 4509 37

SAMUEL E. RANKIN, *in Account with Iowa Agricultural College "Fund for the Purchase of Seeds and Plants," from the 11 day of Jan. 1870, to Nov. 30, 1871 inclusive.*

1870.		DR.		
May 27.	To appropriation by 13th General Assembly	$	500 00	
1871.				
Nov. 1.	To amount transferred from Contingent Fund		63—	$ 500 63

1871.	Cr.			
March 11.	By amount paid Geo. W. Jones, cashier, with exchange.....	$ 500 63	— $	500 63

SAMUEL E. RANKIN, *in Account with Iowa Agricultural College "Gasometer Building Fund," from Jan. 11, 1870, to Nov. 30, 1871, inclusive.*

1870.	Dr.			
May 27.	To appropriation by 13th General Assembly.....	$ 500 00		
1871.				
Nov. 1.	To amount transferred from Contingent Fund.....	63	— $	500 63
1870.	Cr.			
16.	By amount paid Geo. W. Jones, cashier, with exchange.....	500 63	— $	500 63

SAMUEL E. RANKIN, *in account with Iowa Agricultural College Endowment Interest Fund, from January 11, 1870, to November 30, 1871, inclusive.*

1870.	Dr.		
Jan. 11.	To balance in treasury, as per last report.....	$21249 30	
April 1.	To amount received from G.W. Bassett	7426 34	
May 5.	To interest received from Story county, county bonds.....	337 35	
June 30.	To amount received from G. W. Bassett.....	7241 44	
Oct. 5.	To amount received from G. W. Bassett.....	8672 89	
Dec. 1.	To amount received from Thos. J. Stone	640 00	
Dec. 5.	To interest received from Iowa State bonds.....	742 00	

Dec. 5.	To interest on Endowment Fund .....$	238 00	
Dec. 13.	To amount received from Thos. J. Stone	2048 00	
1871.			
Jan. 4.	To amount received from G. W. Bassett.....	6431 75	
April 10.	To amount received from G. W. Bassett	8729 87	
June 26.	To amount received from G. W. Bassett	4500 00	
July 5.	To amount received from G. W. Bassett	2268 61	
Aug. 4.	To interest received on Story county bonds	206 50	
Oct. 8.	To amount received from G. W. Bassett	9277 50	
	Received	$80,009 55	— $80,009 55

1870.	Cr.		
Jan. 19.	By amount paid Prest. A. S. Welch, with exchange....$	2002 50	
Jan. 29.	By amount paid G. W. Jones, cashier	1500 00	
Feb. 10.	By amount paid G. W. Jones, cashier, with exchange....	1500 63	
Feb. 19.	By amount paid G. W. Jones, cashier.....	1500 00	
Mar. 10.	By amount paid G. W. Jones, cashier, with exchange....	1501 88	
Mar. 17.	By amount paid Miss A. Mathews.....	83 33	
Mar. 22.	By amount paid G. W. Jones, cashier, with exchange....	1501 88	
Mar. 30.	By amount paid G. W. Jones, cashier, with exchange....	1500 63	

April 13.	By amount paid G. W. Jones, cashier, with exchange....$	1500 63
May 3.	By amount paid G. W. Jones, cashier, with exchange.....	1001 25
May 5.	By amount paid G. W. Jones, cashier	2000 00
June 7.	By amount paid Des Moines Iron Works.....	12 32
June 7.	By amount paid Hon. H. M. Thompson.....	800 00
June 22.	By amount paid G. W. Jones, cashier.....	1500 00
July 6.	By amount paid G. W. Jones, cashier.....	1500 00
July 18.	By amount paid G. W. Jones, cashier, with exchange....	1501 25
July 25.	By amount paid G. W. Jones, cashier, with exchange....	1501 88
Aug. 10.	By amount paid J. H. Bacon.	200 00
Sept. 16.	By amount paid G. W. Jones, cashier, with exchange.....	1501 87
Oct. 5.	By amount paid G. W. Jones, cashier, with exchange....	1501 25
Nov. 2.	By amount paid G. W. Jones, cashier, with exchange.....	1702 13
Dec. 5.	By amount paid G. W. Jones, cashier, with exchange.....	3001 25
Dec. 15.	By amount transferred to Contingent Fund	6162 55
Dec. 16.	By amount paid G. W. Jones, cashier.....	1500 00
Dec. 29.	By amount paid G. W. Jones, cashier, with exchange.....	1500 94
1871.		
Jan. 2.	By amount paid G. W. Jones, cashier	1000 00

Jan. 25.	By amount paid G. W. Jones, cashier, with exchange.....$	1000 75
Feb. 11.	By amount paid Pres. A. S. Welch, with exchange.....	1501 25
Feb. 25.	By amount paid Prest. Welch	1000 00
Mar. 8.	By amount paid T. J. Cox...	1500 00
April 3.	By amount paid G. W. Jones, cashier, with exchange.....	7006 25
April 7.	By amount paid Mills & Co..	696 50
April 17.	By amount paid G. W. Jones, cashier, with exchange.....	1501 88
April 26.	By amount paid G. W. Jones, cashier.....	1500 00
May 4.	By amount paid G. W. Jones, cashier, with exchange.....	1500 63
May 15.	By amount paid G. W. Jones, cashier, with exchange.....	1501 88
June 6.	By amount paid G. W. Jones, cashier, with exchange.....	1501 87
June 19.	By amount paid G. W. Jones, cashier, with exchange.....	2002 50
June 29.	By amount paid G. W. Jones, cashier, with exchange.....	3001 88
Aug. 4.	By amount paid G. W. Jones, cashier.....	2500 00
Aug. 23.	By amount paid G. W. Jones, cashier, with exchange.....	1001 25
Sept. 4.	By amount paid G. W. Jones, cashier, with exchange.....	2501 25
Nov. 2.	By amount paid G. W. Jones, cashier.....	2000 00
Nov. 30.	By amount transferred to College Building Fund.....	687 25
	Disbursed	$78,383 31—$74 383 31
	Balance in Treasury.....	$5626 24

SAMUEL E. RANKIN *in Account with Iowa Agricultural College "Contingent Fund, from Jan.* 11, 1870, *to Nov.* 30, 1871, *inclusive.*

DR.

1870.				
Dec. 15.	To amount transferred from Endowment Interest Fund ...	$ 6162	55	
1871.				
March 2.	To amount of interest on Story county bonds.....	257	10	
July 27.	To amount of interest on Story county bonds	71	88	
Aug. 4.	To amount of interest on State bonds.....	301	00	
Sept. 13.	To amount received of Thos. J. Stone	1857	27—	8649 80

CR.

1871.				
March 2.	By amount of express charges paid	$ 8	00	
July 27.	By amount of express charges paid	2	50	
Nov. 1.	By amount transferred to Seed and Plant Fund.....		63	
Nov. 1.	By amount transferred to Gasometer Building Fund		62	
Nov. 1.	By amount transferred to Workshop Building Fund	3	13	
Nov. 1.	By amount transferred to Laboratory Building Fund.....	3	75	
Nov. 1.	By amount transferred to Stable, Granary, and Tool-House Fund	2	50	
Nov. 1.	By amount transferred to Fund for Erecting Professors' Houses	9	37	
Nov. 1.	By amount transferred to College Farm Fund.....	8	00	

Nov. 1.	By amount transferred to Farm Improvement Fund.....	$ 1	25	
Nov. 30.	By amount transferred to College Building Fund	24	99—	64 75
	Balance in treasury.....			$ 8,585 05

GENERAL BALANCE.

DR.

1871.			
Nov. 30.	To total receipts in Agricultural College "Building Fund"	$50712	24
Nov. 30.	To total receipts in "Farm Fund"	763	57
Nov. 30.	To total receipts in "Farm Improvement Fund".....	2001	25
Nov. 30.	To total receipts in "Workshop Building Fund".....	5003	13
Nov. 30.	To total receipts in "Laboratory Building Fund".....	5003	75
Nov. 30.	To total receipts in Fund for building "Granary, Stable, and Tool-House.....	2002	50
Nov. 30.	To total receipts in "Fund Building Hog-House, Hen-House and Corn-Crib.....	800	00
Nov. 30.	To total receipts in "Fund for Tile Draining Farm".....	1000	00
Nov. 30.	To total receipts in "Fund for erecting Professors' Houses"	4509	37
Nov. 30.	To total receipts in fund for the Purchase of Seeds and Plants.....	500	63
Nov. 30.	To total receipts in "Gasometer Building fund".....	500	63
Nov. 30.	To total receipts in "Endowment Interest Fund".....	80009	55

Nov. 30.	To total receipts in "Contingent Fund".....	$ 8649 80	
	Total receipts.....	$161,456 42—	$161,456 42

1871. Cr.

Nov. 30.	By total disbursements in Agricultural College "Building Fund".....	$ 48167 60	
Nov. 30.	By total disbursements in Farm Fund.....	763 57	
Nov. 30.	By total disbursements in Farm Improvement Fund.....	2001 25	
Nov. 30.	By total disbursements in Work-shop Building Fund,	5003 13	
Nov. 30.	By total disbursements in Laboratory Building Fund.....	5003 75	
Nov. 30.	By total disbursements in Fund for building Granary, Stable, and Tool-House.....	2002 50	
Nov. 30.	By total disbursements in fund for building Hog-House, Hen-House, and Corn-Crib	800 00	
Nov. 30.	By total disbursements in Fund for Tile Draining Farm....	1000 00	
Nov. 30.	By total disbursements in Fund for Erect'g Professor's Houses,	4509 37	
Nov. 30.	By total disbursements in Fund for Purchase of Seeds and Plants.....	500 63	
Nov. 30.	By total disbursements in Gasometer Building Fund.....	500 63	
Nov. 30.	By total disbursements in Endowment Interest Fund,	74383 31	
Nov. 30.	By total disbursements in Contingent Fund.....	64 75	
	Total disbursements.....	$136,029 06—	136,029 06
	Balance in treasury.....		$ 16,755 93

Belonging to the different funds as follows:

College Building Fund.....	$ 2544 64	
Endowment Interest Fund...	5626 24	
Contingent Fund.....	8585 05	
Total.....	$ 16755 93—	$ 16755 93

Of the above balance of $16,755.93 remaining in the treasury, there is invested in Story county and Iowa State bonds.....	$	9150 00
Leaving a cash balance in the treasury of.....	$	7605 93

CASHIER'S REPORT.

For two fiscal years, to-wit: from Jan. 1, 1870, to Jan. 1, 1870, and from Dec. 1, 1870, to Dec. 1, 1871.

CURRENT EXPENSES.

For salaries, being for payment of professors and teachers for 1870		$ 11008 65
Total disbursements for 1871		14914 50
For contingent expenses, being for the general expenses of the college not otherwise embraced; and particularly for expenses of officers when traveling on special duty, printing, stationery, postage, clerk hire, care of College building, etc:		
Total disbursements for 1870 $3591 00		
Total receipts	7 93	
Net expenditure		3583 07
Total disbursements for 1871 $3462 28		
Total receipts, being mainly from assessments on students in payment for such expenses as pertain specially to themselves	1324 60	

Net expenditures		$ 2137 68
For fires and lights, being for warming and lighting the public rooms and halls:		
Coal on hand, Jan. 1, 1870 $300 00		
Total disbursements for 1870 2893 11		
Whole cost for 1870, $3193 11		
Total receipts, being for lighting and warming private rooms, and for gas and coal used by other departments	$ 1784 48	
Net cost		1408 63
Total disbursements for 1871 $2512 12		
Total receipts	2372 14	
Net cost		139 98
Value of material on hand 120 00		
For Laundry—		
Total disbursements for 1870 1368 26		
Total receipts	1176 81	
Net loss		191 45
Total disbursements for 1871 $1414 34		
Total receipts	1014 23	
Net loss		400 11
For chemicals, being for donations to students in chemistry upon the term bills in 1870		257 37
For gymnasium, being for lumber used in 1870:		
Total disbursements		7 49

For repairs, being for repairs of buildings and furniture for 1870 :			
Total disbursements .	$595 06		
Total receipts, being for fines collected for damages	$ 76 83		
Net cost		518 23	
For furniture, being for purchases to complete the furnishing of the college building, and to replace that destroyed :			
Total disbursements for 1870	$624 89		
Total receipts, being mainly fines for damages	207 34		
Net cost		427 05	
For Military Department—			
Total disbursements for 1870.		53 90	
Net disbursements for 1871..		60 54	
For annual net disbursements for 1871		377 36	
From Musical Instruction, being for use of musical instrument :			
Net receipts for 1870			$ 283 00
Net receipts for 1871			280 00

SUMMARY FOR 1870.

Salaries	$11008 65	
Contingent expenses	3583 07	
Fires and lights	1408 63	
Laundry	191 45	
Chemicals	257 37	
Gymnasium	7 49	
Repairs	518 23	
Furniture	$ 427 05	
Military department	53 90	
Total	17,455 84	
Musical instruction		$ 283 00
Net current expenses for 1870..	17,172 84	

SUMMARY FOR 1871.

Salaries	$14,914 50	
Contingent expenses	2127 68	
Fires and lights	139 98	
Laundry	400 11	
Military department	60 54	
Annual	377 36	
Total	18,030 17	
Musical instruction		280 00
Net current expenses for 1871	17,750 17	
Net current expenses for 1870	17,172 84	
Total current expenses for two years	$34,923 01	

ORDINARY EXPENSES.

For machines and tools :			
Total disbursements for 1870.		$1990 70	
Total disbursements for 1871	$ 5093 06		
Total receipts being for sales, and use of tools and for work done	$985 74		
Net cost		4107 32	
Present value per inventory	$ 6000 00		
Net loss not accounted for	98 02		

For philosophical apparatus:		
Total disbursements for 1870.		$ 588 39
Net disbursements for 1871..		2012 31
For gas-pipe and fittings:		
Total disbursements for 1871.....	$2839 99	
Total receipts, being for sales.....	$ 2758 78	
Net loss.....		81 20
For fitting up lecture-room:		
Net disbursements for 1871..		402 25
For Chemical Laboratory:		
Net disbursement for 1870...		1796 93
Total disbursements for 1871.....	$2175 10	
Total receipts, being mainly for payments by students for chemicals and chemical apparatus consumed by them.	860 48	
Net disbursements.....		1314 67
For laboratory tables:		
Net disbursements for 1871..		853 69
For laboratory fixtures:		
Net disbursements for 1871..		620 05
For Museum:		
Net disbursements for 1870..		87 97
Net disbursements for 1871..		58 06
For Library:		
Net disbursements for 1870...		2329 66
Net disbursements for 1871...		1244 06

For Ornamental Grounds:		
Total disbursements for 1870.		$1516 82
Total disbursements for 1871,	$ 570 00	
Total receipts, being value of hay cut thereon.....	$ 73 27	
Net disbursements.....		496 73
For Orchard:		
Total disbursements for 1870.		157 84
Net disbursements for 1871...		89 52
For Nursery:		
Total disbursements for 1870.		189 04
Total disbursements for 1871.		57 87
For Vineyard:		
Total disbursements for 1870.		134 11
Total disbursements for 1871.		115 34
For Small Fruits:		
Total disbursements for 1870.		151 25
Total disbursements for 1871,	$ 213 08	
Total receipts for fruit.....	2 90	
Net disbursements.....		210 18
For Cemetery:		
Total disbursements for 1870.		6 89
For Microscope:		
Total disbursements for 1871.		66 00
For New Laundry:		
Net disbursements for 1871...		835 69
For Experimental Grounds:		
Total disbursements for 1870.		34 19

For Flower Garden:			
Total disbursements for 1871.			$ 14 13
For College Garden:			
Total disbursements for 1870,	$901 71		
Total receipts.....		$ 398 66	
Net disbursements.....			503 05
Total disbursements for 1871,	569 72		
For experiments..	88 08		
Hot bed.....	26 03		
Improvements ...	79 70		
Permanent crops.	53 60		
Compost heap...	5 53		
Vegetables sold..	313 39		
Crops.....	3 39		
Total receipts.....		373 26	
Hot bed.....	24 00		
College garden, (bal. acc't).....	50		
Permanent crops..	14 50		
Vegetables.....	320 68		
Crops.....	13 58		
Net disbursements.....		195 46	
Value of stores...	39 30		
For Bell—			
Total disbursements.....			299 30

SUMMARY FOR 1870.

Machines and tools	$1990 70
Philosophical apparatus.....	588 39
Chemical laboratory.....	1796 93
Museum	87 97
Library	2329 62
Orna. grounds.....	1516 82

Orchard	$ 157 88
Nursery.....	189 04
Vineyard.....	134 11
Small fruits.....	151 25
Cemetery.....	6 89
College gardens.....	503 05
Total ordinary expenses for 1870,	$9452 69

SUMMARY FOR 1871.

Machines and tools.....	$4107 32
Philosophical apparatus.....	2012 31
Gaspipe.....	81 21
Lecture room.....	402 25
Chemical laboratory.....	1314 67
Laboratory tables.....	853 60
Laboratory fixtures.....	620 05
Museum	58 06
Library	1244 06
Ornamental grounds.....	496 73
Orchard.....	89 52
Nursery.....	57 87
Vineyard.....	115 34
Small fruits.....	210 18
Microscope	66 00
New Laundry.....	835 69
Experimental grounds.....	34 19
Flower garden.....	14 13
College garden.....	196 46
Bell	299 30
Total ordinary expenses for 1871,	$13109 03
Total ordinary expenses for 1870,	9452 69
Total for two years.....	$22561 72

EXTRAORDINARY EXPENSES.

For sewer, being for its completion :	
Total disbursements for 1870.	$ 153 63
For College building, being for the completion of the heating apparatus :	
Total disbursements for 1870.	7373 82
For professors' houses, being for their completion.....	3603 22
Net disbursements for 1870.....$3552 37	
Net disbursements for 1871 .... 50 85	
To addition to President's house:	
Net disbursements for 1870..	1439 14
For repairs of gas house and tank :	
Net disbursements for 1871..	302 67
For heating and ventilating apparatus for laboratory building for 1871 :	
Net disbursements for 1871..	2234 05
For water works, being for attempts by various methods to obtain water for the supply of the College....	800 39
Net disbursements for 1870.....$336 36	
Net disbursements for 1871..... 464 03	

SUMMARY FOR 1870.

Sewer	$ 153 63
College building.....	7373 82
Professors' houses.....	3552 37
Addition to President's house	1439 14
Water works.....	336 36
Total extraordinary expenses for 1870	$ 12,855 32

SUMMARY FOR 1871.

Professors' houses.....	$ 50 85
Repairs to gas-house	302 67
Heating and ventilati g apparatus for Laboratory building.....	2234 05
Water works.....	464 03
Total extraordinary expenses for 1871.....	$ 3051 60
Total extraordinary expenses for 1870.....	12855 32
Total for two years.....	15,906 92

FARM—1870.

	Total disbursements.	Total Receipts.	Net disbursements.	Net receipts.
Farm fund	$ 802 14	$ 955 57	.....	$ 153 43
Farm garden.....	175 16	100 00	$ 75 16	.....
Farm labor.....	265 54	23 20	242 34	.....
Farm incidental expenses	43 38	.....	43 38	.....
Farm implements.	470 42	.....	470 42	.....
Farm cornfield...	656 40	1 50	654 90	.....
Farm oat field....	164 92	.....	164 92	.....
Farm barley field.	6 43	.....	6 43	.....
Farm wheat field.	77 39	.....	77 39	.....
Farm potato field.	150 49	80 03	70 46	.....
Farm hay field....	134 27	.....	134 27	.....
Farm turnip field.	78 16	.....	78 16	.....

FARM—1870.—CONTINUED.

	Total disbursements.	Total receipts.	Net disbursements.	Net receipts.
Farm carrot field	$ 117 27	.....	$ 117 27	.....
Farm beet field	97 32	.....	97 32	.....
Farm stock	2647 44	$ 1744 46	902 98	.....
Farm products	378 62	371 81	6 81	.....
Farm teams	1237 90	1975 50	.....	$ 737 60
Farm boarding house	2323 02	2635 62	.....	312 60
Farm saw logs	87 25	135 27	.....	48 02
Totals	.....	.....	3142 21	1251 65
Net disbursements for 1870	.....	.....	1890 56	.....

In the above, no account has been taken of crops raised, or their use, and no inventory of values of stock, teams, or implements, either at the beginning or at the end of the year, consequently, the results show neither losses nor gains.

Farm capital, being values of inventories for Dec. 1, 1870, as shown below, and the entire working capital (exclusive of real estate) of the concern		$ 10479 21	$ 10479 21
Farm Teams :			
Inventory of 1870	$ 1643 50		
Total disbursements	2674 42		
Total receipts		2660 71	
Inventory for 1871		2609 00	
Totals	4317 92	5269 71	
Net gain			951 79

Farm Stock :			
Inventory of 1870	$5869 83		
Total disbursements	6342 28		
Total receipts		$ 5200 65	
Inventory of 1871		8527 95	
Totals	12212 11	13728 60	
Net gain			$ 1516 49
Farm Swine :			
Inventory of 1870	776 50		
Total disbursements	681 31		
Total receipts		824 13	
Inventory of 1871		1081 75	
Totals	1457 81	1905 88	
Net gain			448 07
Farm Implements :			
Inventory of 1870	1154 65		
Total disbursements	738 68		
Total receipts		355 65	
Inventory of 1871		1577 50	
Totals	1893 33	1933 15	
Net gain			39 82
Farm Household :			
Inventory of 1870	465 64		
Total disbursements	3333 15		
Total receipts		3351 59	
Inventory of 1871		741 95	
Totals	3798 79	4093 54	
Net gain			294 75
Farm Potatoe Field :			
Total disbursements	103 85		
Total receipts		90 41	
Net loss			$ 13 44

Farm Carrot and Beet Field :				
Total disbursements	$ 141 93			
Total receipts.....		$ 258 55		
Net gain.....				$ 116 62
Farm Garden, (turnip field) :				
Total disbursements	75 47			
Total receipt.s.....		59 12		
Net loss.....			$ 16 85	
Farm Corn Field ;				
Total disbursements	1048 73			
Total receipts.....		999 25		
Inventory of corn not distributed...		818 25		
Total.....		1817 50		
Net gain.....				768 77
Farm Rye Field :				
Total disbursements	141 05			
Total receipts.....		67 50		
Inventory of rye in store.....		50 00		
Total.....		117 50		
Net loss.....			23 55	
Farm Oat Field:				
Total disbursements,	134 40			
Total receipts.....		201 30		
Net gain.....				66 90
Farm Wheat Field:				
Total disbursements,	140 49			
Total receipts.....		16 90		
Inventory of wheat in store.....		200 00		
Totals.....	140 49	216 90		
Net gain.....				76 41

Farm Hay Field:				
Total disbursements,	$153 99			
Total receipts.....		$ 498 75		
Net gain.....				$ 344 76
North Farm:				
Total disbursements,	815 64			
Total receipts.....		136 10		
Inventory of crops in store.....		448 00		
Total	815 64	584 10		
Net loss.....			$ 231 54	
Sundry Farm Fields for 1872:				
Total disbursements for preparation...	76 52			
Inventory of value of same..		76 52		
Farm inventory for 1871.....16170 36			16170 36	

SUMMARY FOR 1871.

Farm capital.....			$ 10479 21
Farm teams.....			951 79
Farm stock.....			1516 49
Farm swine.....			448 07
Farm implements.....			39 82
Farm household.....			294 75
Farm potatoe field.		13 44	
Farm carrot and beet field.....			116 62
Farm garden, (turnip field).....		16 85	
Farm corn field.....			768 77
Farm rye field.....		23 55	
Farm oat field.....			66 90
Farm wheat field.....			76 41
Farm hay field.....			344 76
North Farm.....		231 54	
Farm inventory for 1871.....		16170 36	
Totals		16455 74	15103 59

Net disbursements for 1871	$ 1352 15	
Net disbursements for 1870	1890 56	
Total for two years	3242 71	

RE-STATEMENT.

Farm capital. Dec. 1, 1870		$ 10479 21
Net gains for the year		4339 00
Net investment above receipts		1352 15
Farm inventory, being Farm capital, Dec. 1, 1871	$ 16,170 36	$16,170 36

APPROPRIATIONS FOR 1868.

Corn Crib and Hen-House:—			
Appropriation	$ 800 00		
Net disbursements	$ 580 76		
Balance unexpended			$ 219 24
Farm House:—			
Net disbursements		$ 324 11	
Horse Barn:—			
Appropriation	2500 00		
Net disbursements	$2615 71		
Amount overdrawn		115 71	
Farm Implement Shed:—			
Amount unexpended			310 74
Road on south line of farm:—			
Appropriation	$300 00		
Of which was unexpended Jan. 1, 1870,	225 65		
Net disbursements	$176 54		
Balance unexpended			49 06

SUMMARY.

Corn crib			$ 219 24
Farm house		$324 11	
Horse barn		115 71	
Farm implement shed			310 74
Road on south line of farm			49 06
Totals		439 82	579 04
Net balance unexpended			139 22

APPROPRIATIONS OF 1870.

Gas house:—			
Appropriation	$ 500 00		
Net disbursements	$500 00		
Prof. Anthony's house:—			
Appropriation		$ 4500 00	
Net disbursements	4586 80		
Amount paid by Prof. Anthony		86 80	
Total	4586 80	4586 80	
Laboratory building:—			
Appropriation		5000 00	
Net disbursements	4996 31		
Balance unexpended			$ 3 69
Workshop:—			
Appropriation		5000 00	
Net disbursements, main building	2779 38		
Net disbursem'ts, engine house	1145 83		
" " chimney stock	295 81		
" " workshop fix.	217 18		
" " lime house	95 64		
Setting engine boiler, &c.	463 26		
Totals	4997 10	5000 00	

Balance unexpended.....			$ 2 90
Cottage Extension:—			
Appropriation.....$50000 00			
Of which has been drawn....		$ 47461 60	
Net disbursements.....$ 38944 70			
Balance unexpended (here)...			8516 90
Tile Drain:—			
Appropriation.....		1000 00	
Net disbursements.....	982 65		
Balance unexpended.....			17 35
Farm Improvements:—			
Appropriation.....		2000 00	
Net disbursements.....	2025 33		
Amount overdrawn.....			25 33
Appropriation for Purchase of Seeds:—			
Appropriation		500 00	
Net disbursements.....	45 75		
Balance unexpended.....			454 25

SUMMARY.

Gas-house		
Prof. Anthony's house		
Laboratory building.....		$ 3 69
Work shop		2 90
College extension		8516 90
Farm tile drain		17 35
Farm improvements .....$ 25 33		
Appropriation for buying seeds.....		454 25
Totals ....$ 25 33		$8995 09
Net balance unexpended of appropriations of 1871....$8969 76		

INVENTORY (IN PART) OF STOCK ON HAND.

Board account, 1872, for groceries turned over	$ 197 99
Work shop account, 1872, for gas pipe, stone, lumber, etc., turned over	$ 332 70
Fire and light account, 1872, for material turned over..	120 00
Garden account, 1872, for vegetables in store and work done.....	44 05
Medicines	1 37
School books, stationery, etc.....	336 56
	$1032 67

NORTH FARM.

Total disbursements for purchase.....$	5205 00

BOARDING DEPARTMENT.

Total disbursements for 1870 $ 7129 03			
Total receipts.....		$ 17245 20	
Net receipts.....			$ 116 20
Total disbursements for 1871 $14748 49			
Total receipts.....		$ 15105 82	
Net receipts.....			$ 357 33
Total.....			$473 53

GENERAL BALANCE.

NET DISBURSEMENTS.

For current expenses for 1870 .....$	17172 84	
For current expenses for 1871	17750 17—	$ 34923 01
For ordinary expenses for 1870.....	9452 69	
For ordinary expenses for 1871.....	13109 03—	22561 72
For extraordinary expenses for 1870....	12855 32	
For extraordinary expenses for 1871.....	3051 60—	15906 92
For Farm for 1870.....	1890 56	
For Farm for 1871.....	1352 15—	4242 71

For North Farm	$ 5205 00
For bills receivable	334 19
For stock on hand per inventory	1032 67
For cash in safe and bank (balance)	2002 82
	$85,209 04

NET RECEIPTS.

From Interest Fund	$ 71512 17
From appropriations of 1868	139 22
From appropriations of 1870	8969 76
From freight drawbacks	2655 54
From Boarding Department	473 53
From personal deposits (balance)	1458 82
Total	$85,209 04

GEO. W. JONES, *Cashier.*

PROCEEDINGS OF THE BOARD OF TRUSTEES.

IOWA STATE AGRICULTURAL COLLEGE,
AMES, IOWA, December 6, 1871.

Board met pursuant to call for annual meeting.

President A. S. Welch in the chair.

Present—O. H. P. Buchanan, J. D. Wright, J. A. Woodbury, W. Allen, G. F. Kilburn, C. E. Leffingwell, J. H. Bacon, O. O. Stanchfield, P. Melendy, I. J. Mitchell, and C. H. Tenney.

Absent—Governor Merrill, and R. A. Richardson.

The first thing in order was the reading of the President's report. (See report page 9.)

Mr. Bacon moved that the report be referred to the proper committee. Carried.

Farm Superintendent's report read and referred to Committee on Farm. (See page 63.)

The reports of the various departments were then taken up and referred to the committees to which they properly belong.

Bill of O. H. P. Buchanan of $131.96, for expenses and per diem as member of Executive and Building Committee, read and allowed.

Bill of J. D. Wright for expenses and per diem as member of Executive and Building Committee, read and allowed.

Bill of I. J. Mitchell of $35, for expenses and per diem as member of Executive and Building Committee, read and allowed.

Bill of J. H. Bacon of $9.50, for expenses and per diem buying cart and harness, read and allowed.

Committee on proposed new road on west side of the farm, reported as follows:

To the Board of Trustees of the Iowa State Agricultural College and Farm:

Gentlemen:—Your committee appointed at the November meeting, to view, and report on the propriety of permitting a road to be located on part of the west line of the College Farm, beg leave to submit the following:

We proceeded to examine the line of road so far as it relates to the College Farm, and are of the opinion that the road would be an advantage to the farm, making the timber easy of access, etc. The road to commence at a point on the west line of the College Farm, at the center of the highway which runs west past Mr. Porter's house, and running thence along the said line north eleven chains, thence by a meandering course through the lands of Mr. Porter to the southwest corner of a certain ten acre addition to the College Farm, and now a part of the same). Thence along the west line of the said ten acres north twenty chains to the northwest corner of the Farm, and to the lands of G. W. Jones, at which point the line leaves the College Farm; the said road to occupy the land lying westwardly from and outside the willow hedge near the said west line, and to be governed in its width so far as the College Farm is concerned by the width of the strip of land so appropriated west of the said hedge.

We also recommend the purchase from G. W. Jones of a small strip of land containing about two and one-half acres, between the College Farm and the C. & N. W. R. R. at the northwest corner of said College Farm.

All of which is respectfully submitted.

O. H. P. BUCHANAN,
JOHN H. BACON,
W. ALLEN,
Committee.

eport adopted.

Mr. Mitchell moved that a committee of three be appointed to ascertain the necessary steps to be taken in order that the road may be legally laid out.

Carried.

Committee—Messrs. Mitchell, Stanchfield, Kilburn.

Board adjourned to 10 o'clock, a. m., Dec. 7.

DECEMBER 7.

Boad met as per adjournment.

Members absent—J. D. Wright, O. O. Stanchfield, Gov. Merrill.

The Committee on Organization, to whom was referred that part of the President's report relating to the Library, and appointment of additional professors, reported through chairman Stanchfield.

Mr. Kilburn moved that the report be accepted and laid on the table.

Carried.

The Committee on Organization reported on the report of the Professor of Chemistry, as follows;

Your committee, to whom was referred the report of the Professor of Chemistry, would like to present the whole report, and ask that it be adopted as a whole; but, as the funds are low, we would most respectfully ask that the sum of two thousand six hundred dollars be appropriated for the purposes named by the Professor in his report.

STANCHFIELD,
LEFFINGWELL,
WELCH,
MELENDY,
Committee.

Report accepted and adopted.

Committee on Organization reported as follows upon the report of the Professor of Physics and Mechanics:

Your committee, having had the report of the Professor of Physics and Mechanics under consideration, commend the system introduced by the Professor, and hope that the time may soon come when this department of study can be put upon as good a footing in the Iowa Agricultural College as in any other institution of the kind in the country.

In view of the condition of the finances of the college, we cannot comply with the wishes of the Professor, we would, therefore,

respectfully ask that the sum of two thousand six hundred dollars be appropriated out of the interest fund of the Department of Physics and Mechanics.

STANCHFIELD,
LEFFINGWELL,
WELCH,
MELENDY,
Committee.

Report adopted.

REPORT OF COMMITTEE ON STOCK.

Report of Stock Committee read and adopted :

CATTLE.

The Stock Committee would report that they find a decided improvement in the Cattle Department, both in numbers and quality.

The Short Horn Bull "Consul," received from Mr. Sheldon in exchange for the notorious White bull "Oxford," has proven procreative, and his stock shows fine blood, and exhibits such points as an amateur could not help liking, and while we are well pleased with the progeny of the said Bull, we are satisfied that it becomes necessary to purchase another to prevent the great evil of in-breeding. In the Short Horn herd there are the bull "Consul," seven aged cows, two yearlings, and six spring calves. The cows are not such as are desirable for exhibition as prize herd animals, and we believe that the addition of at least two fine bred cows would be a great acquisition to the herd. We would therefore ask for the purchasing of one bull and two cows.

The Devons consist of one bull, one aged cow, and one spring calf, which are of fine quality. The Ayrshire consists of one bull, three cows, one yearling and one spring calf, which would be an honor to any dairy farm. In the Jersey class are one bull, one cow, and one heifer calf, all of fine blood, and in excellent condition ;

also we find quite a number of high grades which show a great improvement upon the natives, thus showing the benefits derived from breeding the natives to thorough bred males.

HORSES.

We are much gratified with the report of the Superintendent of the Farm, showing the amount of work performed by the teams, and the profit derived from such labor, which shows conclusively that we have no idle animals in this department, and at the same time convinces us of the necessity of more horse power to conduct the business of the farm and college to advantage. If we intend to improve the idle, and at present unavailable lands, and to bring them to a state of cultivation, it will become absolutely necessary to have more teams, either horses or mules ; and from the great amount of labor performed by the mule team now upon the farm, and the high state of condition they remained in, we are led to recommend the purchase of at least two more mule teams.

STALLION.

Considering the great demand for large heavy draft horses all over the country, and believing as we do, that great benefit can be conferred upon the agricultural interest of the state at large by improving and enlarging the horses, we would recommend the purchasing of a Percheron or Canadian stallion, to be kept on the farm, not only to raise animals for our own use, but to excite a greater desire among the horse breeders to raise said strain of horses.

SWINE.

In this department there is a manifest improvement, not only in the quality of the animals themselves, but in the feed and care bestowed vpon them. The different breeds consisting of the Berkshires, Chester-Whites, and Spotted or Poland China, exhibit animals approaching perfection. The care with which the breeds are kept pure can be distinctly seen in the animals themselves. The experiments in feeding swine, as now conducted by the Superintendent, giving the actual cost of each pound of pork, the amount

realized for the corn or other grain fed, and showing the difference in the several breeds as to taking on flesh, are very gratifying to us, and we are clearly of the opinion that the time and labor expended in said experiments are amply repaid.

FEED.

Considering the amount of ground grain used in feeding stock, and the perceptible increase of flesh derived from such feed over that of grain in the raw state, it is evident to us, (as it must be to every one,) that a mill should be procured as soon as possible for the grinding of grain. We therefore recommend the purchase of such a mill. All of which is respectfully submitted.

JOHN H. BACON,
Chairman of Stock Committee.

REPORT OF COMMITTEE ON HORTICULTURE.

The Committee on Horticulture reported as follows:

Your Committee on Horticulture to whom was referred the report of Prof. Bessey on Horticulture, and Prof. Mathews, on Pomology, would report that we have examined said reports carefully, and from the reports as well as from our own observation of the management of these departments, we can congratulate the Board on the successful manner in which these departments are carried on. Professors Mathews and Bessey are enthusiasts in their professions, they have labored faithfully in their several departments, as their reports show, and the results attained are highly satisfactory to your committee.

The report of Prof. Bessey presents the result of many experiments made, which will be valuable to the horticulturists of our State, and we would recommend that these experiments be continued hereafter, and the results reported to the Board.

We would especially call attention to that part of the report

relating to insects in our State, destructive to vegetables, and inasmuch as we have no State Entomolgist, it is a valuable feature in the report, and especially to be commended.

The pressing wants for this department are few, comparatively, but a garden-house and tools for this department are most urgently needed. The amount asked for a garden house we consider the very lowest sum that would answer the purpose. The amount is estimated for a garden-house at $2,500.

We concur with Prof. Mathews, that new varieties of fruit, etc., should be tested and experiments entered into in this as well as the other departments, and the results made known through these reports. Prof. Mathews' ideas in regard to the necessity for an abundant supply of fruit for the use of the College, etc., are appreciated by your committee, and we are of the opinion the same should be supplied as fast as can be, with due regard to the claims of other departments. The amount asked for this department we would like to see appropriated, if the same could be done with due consideration for other departments, and refer the same to the Board without recommendation as to the amount, believing that they will deal as liberally with this as the funds at their disposal will permit.

G. F. KILBURN,
W. ALLEN,
C. W. TENNEY,
Committee.

Report adopted.

REPORT OF SPECIAL COMMITTEE.

Report of Special Committee read and adopted.

We, the undersigned members of the committee to whom was referred the portions of the President's report relating to manual labor, etc., would respectfully report that we have carefully examined

the suggestions there made, and would heartily recommend that they be adopted.

C. W. TENNY,
W. ALLEN,
Committee.

On motion, the following were adopted:

Resolved, That the report of the Committee on Water Works be adopted; and that the President be authorized to print, with his report, such parts of the report as he may deem essential.

Resolved, That we ask the legislature for an appropriation of five thousand dollars supplying water to the building, as per report.

REPORT OF COMMITTEE ON WATER SUPPLY.

To the Honorable, the Board of Trustees of the Iowa State Agricultural College:

Gentlemen: — Your committee, to whom was referred the question of *water supply* for this College, beg leave to respectfully report—

First That upon careful examination, they find no adequate supply of water except at the large spring northeast from the barn; and that at that point they do find an abundance of the best water. The supply during the past summer has not failed.

Second. That the present outflow from the spring is distant from the College building, 2300 feet, and from the workshops, 3000 feet. It lies below the terrace 50 feet, and the tanks to be filled are above the terrace about 57 feet, making the total height to rise, 100 feet.

Third. That only two methods seem feasible: the first, by means of a large windmill at the spring forcing the water up through two wide pipes; the second, involves the use of a steam pump placed near the spring with pipes for the conveyance of water to the several tanks, as in the former case. This pump may be driven, either by steam generated by a small boiler at the spring, or by compressed air, forced through a pipe by a compressing air pump (at the workshop) driven by the engine.

The windmill has the advantage of less cost at the start, and of comparatively no cost for running. It has the disadvantage that it cannot be relied on for a constant supply of water. To meet this difficulty, two methods may be suggested: first, to construct an enormous tank, like a railway tank, in the open air, and elevate it upon timber work to a proper height, there to store several days' supply of water; and the other, to construct capacious cisterns in the earth for such storage, and to pump therefrom into the tanks as required. The first, your committee rejected for several reasons: it seemed likely to be very costly, both for construction and repairs; it could not be kept free from frost, and it would furnish stagnant rather than fresh water. The second seemed to require nearly as great cost for pumping as though the water was drawn directly from the spring, to which must be added the cost of the cisterns. For the above reasons, your committee rejected the notion of using a windmill.

The use of a pump driven by compressed air or by steam, has seemed to us the better method, in that it furnishes a constant supply of fresh water, without the use and expense of tank or cistern outside of the buildings.

Your committee suggest that, for ordinary use, the pump may be driven by compressed air, as noted above, using the power of the engine therefor, and requiring no attendance other than that of the engineer in charge of the engine, and with the small cost for running of the slight extra fuel consumed. But for emergencies, such as the breaking of the engine or stoppage for repairs, safety would require a small boiler to be placed near the pump, and thus to run the pump by steam. They present the following estimate for the necessary pipes, pumps, and other appurtenances:

Double steam pump	$ 450 00
3000 feet 2 inch pipe, to convey water, @ 30 cts	900 00
3000 feet 2 inch pipe, to convey air, @ 30 cts	900 00
Compressing pump	600 00
House, over pump at spring	200 00

Ditch for pipe, 180 rods, @ 75 cts	$ 135 00
Laying pipes, 180 rods, @ 30 cts	54 00
Ball cocks for tanks	30 00
Boiler at spring	200 00
Branches and tanks at barns	1000 00
Well	100 00
Fittings, pulleys, beltings, and setting up machinery, say	300 00
	$ 4869 00
For contingencies, the balance of	$5000 00

Which sum we believe sufficient for the above named purpose.

We submit further an estimate of power required to throw 40 barrels per hour into the tanks :

Pressure per square inch of pump piston, to raise the water 100 feet high	46 lbs.
To overcome friction of 2 inch pipe	24 lbs.
	70 lbs.

Pressure of air on steam piston, one half inch in diameter of pump piston	17½ lbs.
Add, to overcome friction of pump, say	4½ lbs.
Add, to overcome friction of air in 2 inch pipe,	1 lb.
Making total air pressure at work shop	23 lbs.

Making power required at work shop, 44000 ft. lbs. per minute, or 1⅛ horse power.

Loss of power by friction of air in 2 inch pipe, 6–100 horse power

In the above estimate, we have assumed that the supply of water needed at the various college buildings, barns, and houses, should not exceed two hundred barrels per day, and that the same might be raised in the space of five hours. Upon an emergency, water could be thrown four times as fast, and of course the pump might be run a greater time, as required. The pump recommended is double,

and may be worked with one side or both at the same time, and may be worked with one side while the other is repairing.

All of which is respectfully submitted.

GEO. W. JONES,
WM. A. ANTHONY,
J. P. ROBERTS,
Committee.

REPORT OF SPECIAL COMMITTEE ON CASHIER'S REPORT.

Report of special committee on Cashier's report read and adopted.

We, the committee, would beg leave to report that we have examined the report as fully as possible in the limited time given us, and find it correct as compared with receipts from Treasurer, and stated in Treasurer's report. We would respectfully recommend that in the biennial report to the Legislatnre it state fully the amount of each appropriation, amount expended, and amount unexpended, yet needed to complete present contracts, so that a surplus, which, does not in reality exist, may not appear. We would recommend that the report of the cashier be received and adopted.

Respectfully submitted.

C. W. TENNEY, *Chairman.*

On motion of Mr. Kilburn it was—

Resolved, That a special committee of Ways and Means be appointed, who shall report to this Board the estimated amount of available means for the college expenses for the year 1872, the estimated amount of expenditures needed for each department, and the funds which should be so appropriated.

Resolved, That the several committees are hereby directed to report to said committee the estimated amounts needed in their respective departments.

Messrs. Welch, Kilburn, and Mitchell appointed committee.

REPORT OF COMMITTEE ON TREASURER'S REPORT.

Report of Committee on Treasurer's report read and adopted.

Your committee to whom was referred the report of Treasurer Rankin, respectfully submit that they have examined carefully the statememts of accounts with the different funds, as made by the Treasurer, with the several vouchers given by him for moneys received and secured by him for moneys payed out, and find the same to be correct in all respects. The vouchers for moneys paid out by him have been all surrendered to your committee, and are returned herewith.

Your committee recommend that the report of the Treasurer be adopted.

C. W. TENNEY, *Chairman.*

REPORT OF COMMITTEE ON FARM.

Report of Committee on Farm read and adopted.

The undersigned Committee on Farm, to whom was referred the report of superintendent of farm would beg leave to report as follows:

It is indeed gratifying to us to behold on every hand the evidences of improvement, not only in the appearance of the stock and the results of the labor of the past year, but in the general thrift, and the good order which seems to prevail in the management of the entire farm under our very efficient superintendent, I. P. Roberts. His report gives the gratifying evidence that the farm as an auxiliary to the college has not been a dead weight upon our hands.

We earnestly recommend that the improvements asked for by the superintendent be provided for, if the necessary means can be obtained. We would also recommend the adoption of report of Stock Committee.

We would further recommend that in the superintendent's report on corn crop grown on prairie breaking, that a reasonable amount for breaking be charged to farm improvement fund, that the profits of this crop may fully appear as they exist. And we particularly desire that these experiments so successfully begun relating to different methods of culture, different kinds of grain and grasses, winter and spring grain, and also the experiments in swine feeding, be continued, and would suggest that further experiments be made upon raw, ground, and cooked food.

All of which is respectfully submitted.

C. W. TENNEY,
W. ALLEN,
Committee.

REPORT OF COMMITTEE ON ORGANIZATION.

Committee on Organization reported as follows:

Your Committee on Organization, to whom was referred that portion of the President's report, relating to the matter of employing new professors, respectfully recommend that the Board of Trustees authorize President Welch to employ a suitable person to fill the chair of Professor of Practical Agriculture, and also a suitable person to fill the chair of Professor of Geology, at a salary of not over $1,500 each.

Your committee also respectfully recommend that the Board of Trustees elect Mrs. Ellen S. Tupper to the position of Lecturer on "Bee Culture."

Your committee further recommend that the sum of $3,000 be appropriated out of the proper fund for the purpose of purchasing books for the College Library.

All of which is respectfully submitted.

O. O. STANCHFIELD, *Chairman.*

Report taken up by sections and adopted.

Moved by Mr. Kilburn that the President be relieved from the chair of Professor of English Literature, and that he be transferred to the chair of Mental Philosophy and Political Economy.

Carried.

On motion, the Hon. S. E. Rankin was elected Treasurer of the College for the ensuing year.

On motion of Mr. Bacon, Messrs. Welch, Rankin, and Jones were appointed a committee to simplify the present system of book-keeping for the College.

On motion of Mr. Melendy it was

Resolved, That the President take such steps as he may think best to institute a department, to be called a Building Material Museum, after a plan recommended by a Harvard professor, of which the following will give the outline:

"Have a building material-museum. It need cost but little to make or keep. No buildings would be required. Have a yard prepared with suitable fences, gates, paths, etc., and in it let every quarryman place a specimen of his wares. Invite every dealer in stone, natural or artificial, bricks, slate, sandstone, tiles, glass, terra cotta, iron, and concrete, etc., to place a sample in the museum. Have the specimens as near as possible of one size, and give all an equal exposure to the open air. Let the rain, frost, and snow, do what they will with them. Every honest dealer would be glad of such a permanent advertisement, and a refusal to exhibit would answer for a warning against a poor article, afraid of the test.

"Have the name of the material and the dealer affixed to each sample, and publish a catalogue. Have the exhibition open to the public at all times.

"Here, in a few months or years, we should be able to tell whose marble was the fairest, and what kind kept its polish best. We could decide which granite was the best, and learn who sold the best bricks and slate. We could discover the faulty sandstones, and detect the weak points in any stone quarried. Such a museum would be of great value to the building trade, and a place of curious interest and study for all.

On motion, adjourned.

DECEMBER 8.

Board met at 9:30 a. m.

President Welch in the chair.

All the members present, except Messrs. Merrill, Richardson, and Wright.

On motion of Mr. Melendy, G. W. Jones was appointed Professor of Architecture and Civil Engineering, with an additional salary of four hundred dollars, making in the aggregate two thousand four hundred dollars.

On motion of Mr. Leffingwell, Professor Geddes was appointed Cashier, the question of additional salary being postponed until after the report of the Special Committee on Book-keeping shall have been received.

Report of Special Committee on Land Agent's report, read and adopted.

We, the Committee to whom was referred the report of Geo. W. Bassett, Land Agent for the College, have examined the same, and compared the amounts stated therein as paid to the College Treasurer, with said Treasurer's report, and find the same correct. It is also evident from the same report that we have something over 19,000 acres of land in the aggregate at present not leased, and that are of no immediate avail to us. It has not been necessary in time past to have the benefit of this part of our resources, but the need may soon arise, and as the lands are free from taxes, and desirable in many respects, it may be possible that in some cases the valuation of these lands has been too high. It is, therefore, recommended that this matter be carefully considered.

C. W. TENNEY, *Chairman.*

On motion it was resolved that a committee of two be appointed by the chair to visit the Fort Dodge and Sioux City Land Districts, and to prepare a map of the college lands, showing streams, railroads, and proposed railroads, precise location, and to report on the valuation of the same; said committee to receive actual travelling expenses, as per itemized bill, and five dollars per day.

Messrs. Tenney and Melendy appointed as such committee.

On motion of Mr. Kilburn it was resolved that the Governor of the State, Hon. Samuel Merrill, the Governor elect, Hon. C. C. Carpenter, and the ex-Governor, together with the out-going members of this Board, who have not already done so, be requested to furnish their photographs, to be placed among the archives of the Iowa Agricultural College.

The Executive Committee, having under consideration Professor Geddes' Report, beg leave to submit the following:

We think that the Board of Trustees should earnestly recommend that all able-bodied male students should drill and uniform themselves, in accordance with Professor Geddes' recommendation, but we do not think that the same should be compulsory.

We recommend that the Legislature be asked to appropriate the sum of one hundred and fifty dollars to construct a gun-house.

And we further recommend that the superintendent be authorized to fit up an armory in the basement of the south wing, out of the college extension fund, the cost not to exceed the sum of seventy-five dollars.

A. S. WELCH,
O. H. P. BUCHANAN,
I. J. MITCHELL,
Committee.

Report adopted.

Executive Committee made special report as follows:

The Executive Committee, having in charge the President's report on students' expenses, recommend that the proposed charges for chemicals be erased and left, according to vote of the Board, to the discretion of the President and the Professor of Chemistry; and that no charge be made for the use of musical instruments. With these changes they recommend the adoption of the article on expenses.

The Committee further recommend that the estimated sums for buildings and other improvements, in the President's Report, be adopted and asked for as follows:

For building for Students' Rooms	$35000 00
For Physical Laboratory	45000 00

For Farm Improvements	$ 7000 00
For Garden House	2500 00
For Professors' House	4500 00
For Orchard and Vineyard	1000 00
For supplying water to buildings	5000 00
For Furniture for main wing	3000 00

The Committee recommend also that four thousand dollars be asked for, to be expended for furniture for the rooms in the new wings, consisting of chapel, recitation-rooms, drawing-room, and student's room.

O. H. P. BUCHANAN,
I. J. MITCHELL,
A. S. WELCH,
Committee.

REPORT OF COMMITTEE ON ORGANIZATION.

The Committee on organization reported as follows on the matter of diplomas:

Your Commitee to whom was referred that part of the President's report relating to the matter of diplomas, having had the subject under consideration, respectfully recommend that that portion of the report, with its recommendations be adopted by the Board of Trustees.

O. O. STANCHFIELD,
Chairman.

Report adopted.

On motion of Mr. Bacon, the sum of three thousand dollars was appropriated for the purpose of buying a stallion, a Short Horn bull, two Short Horn cows, and a feed mill.

On motion of Mr. Mitchell, it was resolved that there be an order drawn upon the cashier in favor of S. E. Rankin for twenty dollars, for expenses in full, incurred in two visits to Nevada to collect

interest on bonds belonging to the Iowa State Agricultural College and Farm.

On motion of Mr. Stanchfield it was resolved that there be drawn an order in favor of S. E. Rankin, Treasurer, for the sum of one thousand dollars, already allowed him for his services up to the present year, and also for the further sum of three hundred and thirty-three dollars for his services for the year 1871, one-half of said amount to be drawn from the College Extension Fund, and one-half from the Endowment Interest Fund.

On motion of Mr. Mitchell, it was resolved that the Treasurer be authorized to transfer from the Contingent Fund the sum of six hundred and eighty-seven dollars and twenty-five cents, to the fund for the completion of College building.

On motion of Mr. Buchanan it was resolved that the President be authorized to draw an order on the Freight Draw-back Fund, for the amount of one hundred and ninety-five dollars, as payment in full for well and stable near Professor Jones' house.

Executive and Building Committee's Report read, and on motion of Mr. Bacon, adopted.

(See Report on page ——)

Report of the Committee on New Road read and adopted.

Your committee, to whom was referred the question of the legality of action by this Board of Trustees, in laying a road along the west border of this farm, beg leave to report, that in their judgment such action would not be legal. Your committee are informed that the present traveled road along a part of the south and west lines of the farm, being about one hundred and forty rods in length, has never been laid by competent authority, being now used by the public, by sufferance of the College. They therefore recommend that the General Assembly be memorialized to allow the laying of the said road or roads, to-wit: that now used as a highway above named, and that part of the same line continued which is contemplated in the appointment of the committee.

G. F. KILBURN,
I. J. MITCHELL,
Committee.

Motion made and carried, that that part of the first report on new road, recommending the purchase of certain lands (described therein) from G. W. Jones, be referred to the Executive Committee.

On motion, the ladies' course of study, as laid down in the President's report, was adopted.

On motion of Mr. Bacon, I. P. Roberts was elected Secretary of the Board and Superintendent of the Farm.

On motion of Mr. Mitchell, the following committee was appointed to examine the question of salaries here and elsewhere, and report at the May meeting.

Messrs, Mitchell, Kilburn, and Tenney appointed as such committee.

Motion made by Mr. Bacon, that instrumental music be stricken from the course of study, and that the President be hereby authorized to employ some competent person to teach music to such as desire it, whose pay shall be received from pupils taking such study.

Carried.

Report of Executive Committee, on physical laboratory and gas works, read and adopted.

The Executive Committee recommend that the report of Prof. Anthony, on the proposed physical laboratory, be adopted, excepting the plans for gas works, and buildings for the same, which they recommend shall be left in the hands of the Building Committee for further examination.

A. S. WELCH,
Chairman pro tem.

Hon. A. Welch, President Iowa State Agricultural College:

Dear Sir:—I present herewith plans for a new building, to furnish rooms for the departments of Chemistry, Physics and Mechanics, and Civil Engineering and Architecture.

The plan contemplates an additional story and French roof for the present laboratory building, which will furnish the chemical department the following additional rooms: A room for Quantitative

Analysis, one for Metallurgical operations, and others for manufacturing chemicals. On the first floor of the main building are rooms for advanced students in physical manipulation, and a reading-room for books of reference and periodicals referring to the departments represented in the building. On the second floor, are a recitation and lecture room for Physics and Mechanics, and an apparatus room, which will serve also as a physical laboratory for students beginning the study of experimental Physics. On the third floor, are a recitation and lecture room for the department of Civil Engineering and Architecture, a room for models, and rooms for mechanical drawing. The whole will cost about $42,000. The demand for these rooms is most urgent. During the past year, the classes in Physics have recited in the chemical recitation room, and the consequence has been that no proper preparation could be made for illustrative experiments in either department. The Physical apparatus has been kept in a basement room where the dampness would soon render valueless any instruments intended for nice measurements. No more apparatus can be accommodated till rooms and cases can be provided where it can be preserved. The State of Iowa has established this college for the purpose of giving instruction in "Natural Philosophy, Chemistry," etc., etc., and it is presumed that she wishes to make that instruction full and complete. This can only be done by accumulating apparatus and furnishing every facility for professors and students to use it. Apparatus *must* be accumulated, and rooms *must* be provided for its preservation and use, or the college fails to give instruction in those branches which are of most vital importance in the accomplishment of its object.

It may be asked, what is the object of a Physical laboratory? I answer, to give students an opportunity to perform, with their own hands, the experiments described in the text-books, and to put in practice the principles and methods there given. Such a course will give the student a more detailed, more accurate, more practical knowledge of the subject; but, above all, it will give a knowledge of the methods of scientific research, it will educate the judgment; it will train the student to habits of careful observation, and close attention to conditions. Such a training, it is the main object of the "new education" to give. It is such a training as will enable

farmers and mechanics to apply scientific truth and improve upon old methods.

Iowa must not be behind her sister States in the facilities she offers for obtaining a practical scientific education. Let her rather offer such advantages as shall be the pride of the State. The provision of such advantages is not an expense without return. On the contrary, with all the vast resources of this great State to be developed, the return to be expected is far beyond what could be derived from any other investment.

WILLIAM A. ANTHONY,
Professor of Physics and Mechanics.

Hon. A. S. Welch, President I. S. A. C.:

DEAR SIR:—I beg leave to submit the following in regard to gas supply:

The present gas-holder is barely sufficient to supply the present demand for gas. When the additions to the wings are occupied, a larger gas-holder will be a necessity. The draft of the present flue has proved inadequate for the furnace used in making the gas, and there are many disadvantages connected with the position of the works so near the main building. I would suggest that the present gas-holder remain where it is, but that a new gas-holder and new works of sufficient capacity to supply, not only the present buildings but all the buildings that are contemplated in the future, be erected near the workshop. I think a gas-holder of 5,000 cubic feet, with a bench of three retorts, such as are used at the present works, will supply the present and prospective demand. Such a gas-holder, with the works, buildings, and smoke stack, will cost about $3,000.

WM. A. ANTHONY.

The Executive Committee reported as follows:

The Executive Committee, in accordance with the instructions o the Board, report that they have purchased the land of G. W. Jones, described in the Special Committee's report, for the sum of one hundred dollars, and recommend that President Welch be authorized to

draw a warrant in favor of G. W. Jones for said sum, whenever the said Jones shall make and execute a good and sufficient warranty deed, to the Iowa State Agricultural College and farm, for said land.

A. S. WELCH,
O. H. P. BUCHANAN,
I. J. MITCHELL,
Committee.

On motion of Mr. Bacon it was resolved that all notes in the hands of the cashier, belonging to the college and farm, (excepting the donation notes), be turned over to Treasurer Rankin, and that the donation notes be turned over to Mr. Mitchell for collection.

Motion made that the President be authorized to present to the Legislature the matter of re imbursing moneys paid out to Land Agent Bassett for leasing lands. Carried.

Motion made that the President be authorized to present to the Legislature the matter of refunding to the college moneys expended on repairs of college building, the same having been so expended with a view to its being refunded. Carried.

On motion the President was allowed the sum of ten dollars for the amount paid Rev. W. H. Wynn, as travelling expenses.

On motion it was resolved that the Executive Committee be authorized and instructed to accept the new wing of the college building when completed, to settle with the contractors, and to do and perform all things necessary to settle and adjust all claims, and all business connected with the college extension, as fully as the Board of Trustees can do.

On motion the Board adjourned *sine die*.

I. P. ROBERTS, *Secretary.*

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